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# How Business Intelligence is Adding Business Value

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*A dissertation presented to the Department of Information Systems -  
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CRSMAR018

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## Abstract

Business Intelligence (BI) continues to top the list of CIO priorities, investment in BI technologies continues to grow and organizations are becoming increasingly reliant on BI to help reduce costs and grow revenues. However, structured measurement and monitoring of the business value that can be attributed to BI investment remain elusive.

This study used a multiple case study approach to examine how BI is adding value to organizations, what processes and methods are being followed for the evaluation of the business value that BI delivers as well as what approaches are being used to maximize the potential value that the organization's investment on BI could deliver.

The results show that organizations need to assess their information maturity level, identify an owner for BI and have a clear BI strategy before embarking on a BI program or major BI project. The interviewees were able to suggest a number of approaches that could be taken to optimize the business value returned from the investment made in BI. The study also found that there is a need for a measurement approach that takes intangible and soft benefits into account and in the continued absence of such a tool, BI stakeholders continue to assess the business value that BI delivers based on "gut-feel".

University of Cape Town

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Thank you to my supervisor Prof. Derek Smith for advice, guidance and support.

And to Chris, for your patience, support and encouragement.

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## **Glossary of Terms and Abbreviations**

ABR – Active Benefits Realization

BI – Business Intelligence

BICC – Business Intelligence Competency Centre

CIO – Chief Information Officer

DQ – Data Quality

ETL – Extract, Transform and Load. Data integration processes used to extract data from source systems and transform it into the format needed for loading into a data warehouse or data mart

IRR – Internal Rate of Return

IS – Information Systems

IT – Information Technology

NPV – Net Present Value

OCG – Office of Government Commerce (UK)

OLAP – Online Analytical Processing

PMI – Project Management Institute

ROI – Return On Investment

TCO – Total Cost of Ownership

TDWI – The Data Warehousing Institute



## Chapter 1 – Introduction

Business Intelligence (BI) is a term used to describe a wide range of tools and technologies used for integrating, analyzing and presenting information which enables improved enterprise decision making (Ranjan, 2008). BI facilitates the connections in the modern organization, bringing real-time information to centralised repositories where it can be used to support analytics that can be exploited at every horizontal and vertical level within and outside of the organization (Malhotra, 2000 in Ranjan, 2008). In short, BI is about delivering the right information to the right people at the right time in order for it to be used to support effective decision making (Miller, Bräutigam & Gerlach, 2006).

“The old foundations of success are gone. For all of human history the source of success has been controlling natural resources – land, gold. Suddenly the answer is ‘knowledge’. The king of the knowledge economy, Bill Gates, owns no land, no gold, no oil, no industrial process. How does one use knowledge to build wealth? How do societies have to be reorganized to generate a wealth-enhancing knowledge environment? How do they incubate the entrepreneurs necessary to bring about change and create wealth? What skills are needed? The knowledge-based economy is asking new questions, giving new answers and developing new rules for success” (Thurow, 1999 in Parr-Rudd, 2009).

In the new “knowledge based economy”, organizations are looking to BI to help them reduce costs and increase revenue (Corcoran, 2008) as the effective use of BI can be the difference between bankruptcy and survival in times of financial uncertainty (Ranjan, 2008). Prior to 2008, Information Technology (IT) budgets were predicted to continue to grow but the current tough economic climate has seen reductions in overall IT budgets and increasing pressure on organizations to ensure that investment in technology delivers value (Dignan, 2008). BI remains a top priority for CIOs (Luftman & Kempaiah, 2008) and spending on BI is increasing (Alter, 2007). Research company IDC estimated that it would reach US\$6.1 billion by 2008 (Elbashir, Collier & Davern, 2008).

The increased investment in BI emphasizes the need for effective methods to be used to evaluate BI and the value it adds to an organization (Gibson & Arnott, 2005). Whilst BI initiatives often focus on measurement of organizational or business process performance and the adage “what gets measured, gets done”, BI itself is seldom measured. The benefits and business value associated with the implementation of BI initiatives are often intangible, indirect, delayed and of a non-financial

nature (Lonnqvist & Pirttimaki, 2006). Delivery of intangible project outcomes is a key differentiator between good and better projects (Nogeste & Walker, 2008). Prior studies have shown that the evaluation of the contribution made by IT investments to business value is a complex challenge which needs to consider financial measures, social conditions, business processes and technology aspects (Lin & Pervan, 2001(b)). There is growing recognition that investment in IT alone will not create value and that the realization of value is dependent on the manner in which resources are utilised (Ashurst, Doherty & Peppard, 2008).

Regardless of the nature of the benefit expected from IT investment – whether financial, tangible, delayed or indirect – it is unlikely that any benefit will be realized unless it can be effectively measured and monitored (Reiss, Anthony, Chapman, Leigh, Pyne & Rayner, 2006; Symons, 2006) a view supported by Kaplan and Norton (1992) who state that “what you measure is what you get”. However with BI, there is also a view that if BI is being used, it is adding value – even if the value cannot be measured (Crossland, 2007) and that the understanding of the value of BI can be implicit (Gibson & Arnott, 2005). The problem with decisions and assessments made on “gut-feel” is that they cannot be measured or repeated or easily understood by others (Miller et al., 2006). The “build it and they will come” approach that was used to justify BI investment in the 1990s is no longer acceptable to investment decision makers (Whittemore, 2009, p1).

One of the reasons cited for IT investment not delivering the expected business benefit is a lack of defined processes for identifying, measuring and managing benefits (Bennington & Baccarini, 2004). In order for measurement to succeed, the correct metrics must be measured with appropriate focus and the correct time. Structured benefits management and measurement approaches such as Benefits Management, Balanced Scorecards and Outcomes Profiling have been proposed as ways to improve value realization from IT investment.

The reasons offered as to why BI projects fail to deliver the value expected include a lack of understanding of the complexity of the BI initiative being undertaken, unavailable, unengaged and unwilling stakeholders, inappropriate team structures, poor data quality and a lack of understanding of the business requirements (Moss & Atre, 2003). In the same way that organizations have built up an IT asset base, comprising hardware, software, data and knowledge that must be managed effectively if it is to continue to support the changing needs of the business and enable (rather than constrain) change (Ramdani, 2009), many organizations now have a BI asset base that needs to be managed to ensure that it continues to deliver value to the organization, even in times such as the current economic downturn when the organizations’ priorities and strategy may change.

## The Need for Further Research

There has been limited research into the evaluation of BI which makes it difficult to ascertain whether or not the approaches used to measure IT value are appropriate for measuring the value investment in BI adds to an organization (Gibson, Arnott & Jagielska, 2004). It is important to understand what benefits are achieved by organizations that use BI but no specific method for measuring the benefits exists (Elbashir et al., 2008). There is a need for research that examines the processes and methods that are being used for the evaluation of BI (Gibson, et al., 2004). Venter and Tustin's (2006) study of BI in South Africa calls for qualitative research into the 'soft' issues that play a key role in the deployment of BI as well as how BI adds value to an organization. There is a need for further commercial and academic research into BI (Hannula & Pirttimaki, 2003; Pirttimaki, 2007).

Although there have been a number of prior studies into how a benefits management approach can be used to improve the outcome of IT projects, most studies conclude that the approach is not widely followed in practice and that there is a need for "novel contributions into how an explicit focus on benefits realization might be incorporated into the actual routines of systems development and implementation" (Ashurst et al., 2008, p353).

## Research Questions

This research aims to address the following questions:

1. *How is BI adding value to organizations in South Africa?*
2. *What processes and methods are being used for the evaluation of the business value that BI delivers and what challenges have been encountered?*
3. *What approaches are being used within these organizations to maximize the potential benefit that can be realized from the investment that has been made in BI?*

## Outline of the Dissertation

The paper begins with a literature review that conceptualises BI, explores IT value and its measurement as well as BI value and prior research into its measurement. Chapter 3 explains the process that was followed for this study. The findings of the analysis of the data, presented according to the main themes that emerged, are presented in Chapter 4 and discussed further in Chapter 5. The conclusion (Chapter 6) closes the dissertation.

## Chapter 2 - Literature Review

### Business Intelligence Defined

Although there are differing opinions as to what BI is (Pirttimaki, 2007; Gibson & Arnott, 2005), the term 'business intelligence' is generally used to describe a group of tools and technologies whose purpose is assisting decision makers across the organization to make more efficient and effective, fact-based decisions (Gibson, et al., 2004; Ranjan, 2008). BI involves an organization's own information (internal) as well as competitor, market and environmental (external) information (Pirttimaki, 2007). BI can be seen as the process of turning data into information and then into knowledge (Haag, Baltzan & Phillips, 2008; Venter & Tustin, 2006). BI tools and techniques include data warehouses, data marts, data integration tools such as ETL processes, OLAP, scorecards, querying, reporting, dashboards, data visualization, data mining, knowledge management and decision support systems (Moss & Atre, 2003; Venter & Tustin, 2006). Figure 1 shows a typical BI environment.

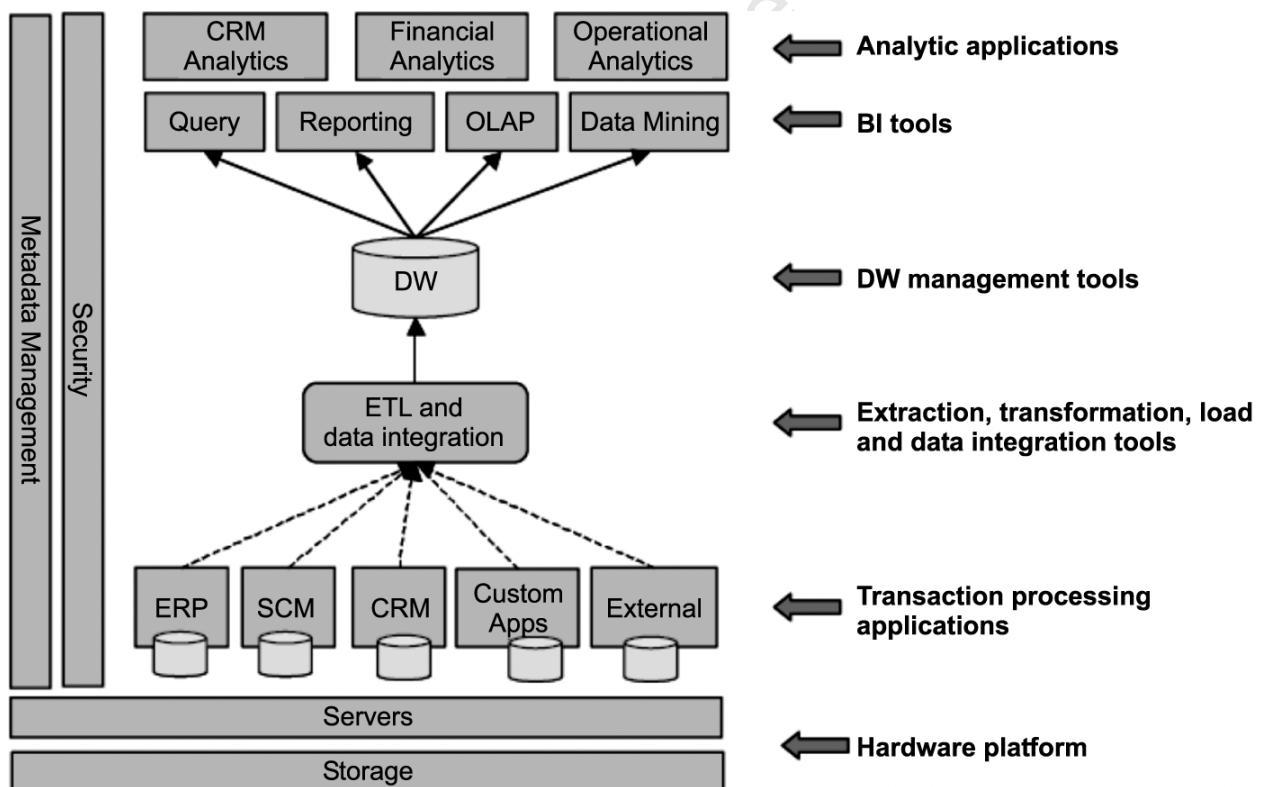


Figure 1 - A BI Environment – IDC (2005) in Ranjan (2008)

Increased reliance on IT systems has led to increased volumes of valuable data that can be used to support business decisions being available within organizations but there are many challenges in collecting and accessing this data (Haag, Baltzan & Phillips, 2008). Spreadsheets have offered

business users the flexibility to analyze and interpret data without relying on IT resources. However, producing these spreadsheets can be time consuming and the risks associated with reliance on user generated spreadsheets include the emergence of multiple versions of the truth (as there is little control over the source of data used) and user errors in results produced (Oco, Inc., 2007).

Investment in ERP and CRM systems is another factor driving the need for BI solutions – these systems capture large volumes of data but do not necessarily offer quick access to the right information for use in decision making (Ranjan, 2008; Williams & Williams, 2007).

The recent economic climate has seen business profits decline and organizations have begun to recognize the role that information and knowledge play in gaining and maintaining competitive advantage (Gibson et al., 2004). Many organizations look to BI to address a business challenge (such as rapid growth or the launch of a new product) or to address an existing business problem (declining profits, poor customer service or a lack of information available internally) (Oco, Inc., 2007). An effectively implemented BI solution means that information can be exploited to increase profits and performance (Williams & Williams, 2007).

BI allows an organization to use data proactively rather than reactively (Ranjan, 2008). The proactive use of BI transforms data from internal and external sources into information that can be used to ensure competitive advantage. However, there is also a role for the reactive use of the information delivered from BI. For example, the results and findings of monitoring operational processes can be used to support a decision to change those processes to be more supportive of organizational strategy (Ranjan, 2008).

BI can be defined as “leveraging a suite of tools and technologies to enhance the decision making process by transforming data into valuable and actionable knowledge to gain a competitive advantage” (Venter & Tustin, 2006, p. 6). Figure 2 illustrates how the transformation of data into information and knowledge can create competitive advantage for an organization.

In Figure 2, the lower end deliverables (standard and adhoc reports, query drill downs and alerts) typically look at historical data to address questions such as ‘what happened?’, ‘how many?’, ‘where is the problem?’ and ‘what actions are needed?’. The true value of BI will be realized when organizations use BI to address the questions that can be answered by the higher end (or analytics) components - statistical analysis (‘why is this happening?’), forecasting (‘what if these trends continue?’), predictive modeling (‘what will happen next?’) and optimization (‘what’s the best that can happen?’) (Davenport & Harris, 2007).

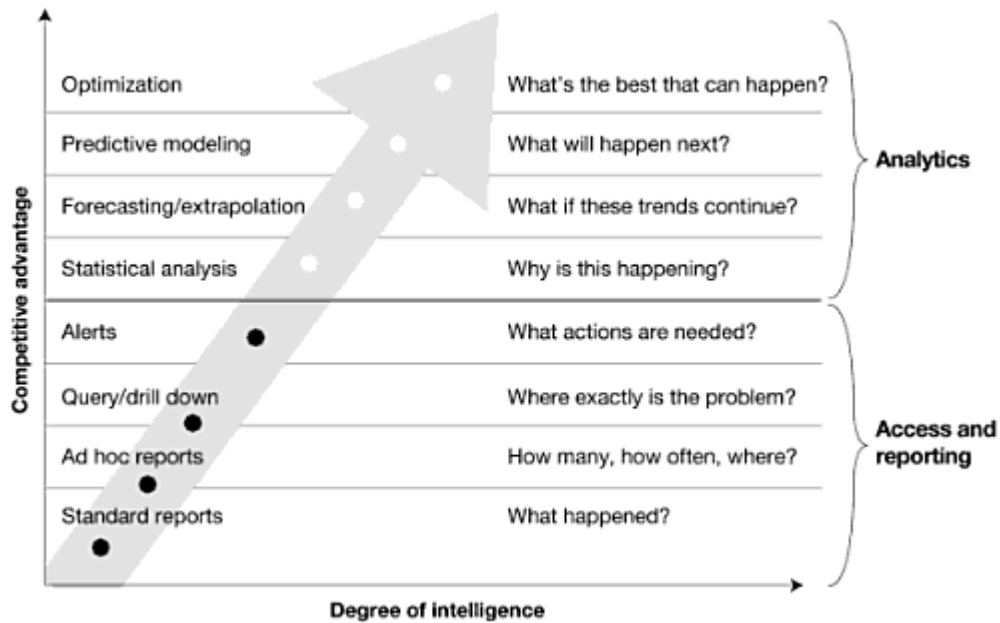


Figure 2 - Business Intelligence and Analytics (Davenport & Harris, 2007)

In a similar vein, Davis, Miller and Russell (2006), propose an Information Evolution Model (IEM) as a framework through which to examine an organization's information management maturity. The model identifies five levels of information management maturity: Operational, Consolidation, Integration, Optimization and Innovation.

- Operational level: the organization is focused on the information needed to support day to day operations, information represents personal power and there are several versions of the truth. Decisions are made in an unstructured manner and individuals have authority over information usage. Results are not verified before publication
- Consolidate level: clearly established functions and departments and information used to achieve departmental objectives and is kept at departmental level. Departmental measures are inconsistent across the organization and several versions of the truth exist. Organizational goals have been identified and are tracked and measured manually
- Integrate level: information environment is established. A single version of the truth is agreed on and information needs and requirements can be linked to organizational goals and objectives. Enterprise level information is available and used in decision making. Information management concepts such as data quality management are put in place
- Optimize level: the market place can be monitored and an organization can adapt quickly to new demands. Information is an integral part of measuring, aligning and improving business processes and drives empirically based decision making. The organization is focused on

improving and optimizing how it operates. The business value chain is clearly understood and supported by closed loop feedback from analysis of data and information

- Innovate level: organization is innovative and adaptable and uses its competencies and information to expand into new markets and products, leveraging on the new efficiencies achieved at the Optimize level. Ideas and experiments are welcomed and cross-industry and enterprise-wide data is used to forecast and manage risk associated with new ventures

The models proposed by Davenport and Harris (2007) and Davis et al. (2006) suggest that an organization will only realize the true value of its investment in BI once a certain level of maturity has been achieved. However, both models reflect an evolutionary process where achievement of higher levels is somewhat dependent on first reaching the preceding maturity level or producing the less complex artifacts.

### **Benefits, Value, Objectives, Outputs and Outcomes Defined**

There are a number of terms that are used (often interchangeably) in the literature regarding the evaluation of IT investment. The Cambridge Dictionary (2009) defines value as “the importance or worth of something for someone “ or “how useful or important something is”. Value is a subjective concept and perception of value will vary depending of the needs of the person assessing it (Lonnqvist & Pirrtimaki, 2006). Value can be described as IT’s ability to enhance business performance of the organization (Bannister & Remenyi, 2000). Evaluation is the process of assessing the value of something (Remenyi, Sherwood-Smith & White, 1998).

Project objectives are quantifiable criteria that must be met for the project to be considered a success (PMI, 2000). Project objectives are linked to cost, schedule and quality and must have an attribute, a metric and an absolute or relative measure. Setting unquantifiable objectives (such as customer satisfaction) increases the risk of a project not being considered a success (PMI, 2000). Business objectives are broad and do not have to be measurable whilst business goals are tactical and measurable (Whittemore, 2009).

A benefit is “a helpful or good effect, or something intended to help” or “to be helped by something or to help someone” (Cambridge Dictionary, 2009). Benefits are advantages afforded to individuals or groups as a result of meeting an objective (Ward, Daniel & Peppard, 2008).

An outcome is a result or effect of an action (Cambridge Dictionary, 2009). The PMI (2000) definition of an outcome includes intangible outcomes such as people who can effectively apply training they have received but also includes tangible deliverables (such as buildings or roads).

Outputs are project deliverables or the results of activities that can be stated or measured (Nogeste & Walker, 2008). A project deliverable is a “measurable, tangible, verifiable outcome, result or item that must be produced to complete a project or part of a project” (PMI, 2000, p200).

In the context of IT investment, a benefit is “an outcome whose nature and value are considered advantageous to an organization” (Thorp, 1999 cited in Bennington & Baccarini, 2004, p21). An outcome is necessary for a benefit to be realized (Nogeste & Walker, 2008). The term ‘success factor’ can be used to describe most business-related phenomena (Lonnqvist, 2002).

### **Types of Benefits and their Measurement**

There are a number of ways in which benefits can be classified. Benefits can be grouped as either efficiency benefits (doing things differently) or effectiveness benefits (doing different things) (Bennington & Baccarini, 2004). Traditionally, organizations have tended to focus on efficiency benefits rather than effectiveness benefits as they are easier to quantify. However, effectiveness benefits are more likely to result in a strategic advantage for the organization (Bennington & Baccarini, 2004). In order for benefits to be realized, an organization needs to start doing new things, doing things differently or to stop doing something (Ward et al., 2008).

Benefits can also be described as either tangible or intangible. Tangible benefits are those which can be measured by an “objective, quantitative and often financial measures”, whilst intangible benefits require a qualitative measure and a subjective approach (Ward & Daniel, 2006, p20). Tangible benefits have a direct impact on profitability whilst intangible benefits have a positive impact on the organization but may not have a direct effect on profitability (Remenyi et al., 1998). Tangible outcomes can be measured, monitored and controlled whilst intangible outcomes can only be assessed on scales of perception (Nogeste & Walker, 2005).

Intangible benefits which may be related to IT investment include improved customer service, competitive advantage and time-to-market for new products (Ward & Daniel, 2006). Intangible benefits are now considered to be a key source of growth, competitive advantage and value creation (Garcia-Ayuso, 2003) and there is a growing need to focus on the intangible outcomes of projects



(Nogeste & Walker, 2005). Perception-based measurement offers insight into intangible benefits (Elbashir et al., 2008).

Another basis on which to classify benefits is whether they are financial or non-financial. The value of financial benefits can be quantified using a financial formula. Financial benefits are typically tangible in nature and can be measured as monetary values (e.g. profitability) but can also be intangible (e.g. goodwill). Figure 3 classifies typical organizational success factors as tangible/intangible and financial/non-financial.

Success Factors	
	Financial
Tangible	<ul style="list-style-type: none"> <li>- Economic growth</li> <li>- Liquidity</li> <li>- Product / service costs</li> <li>- Profitability</li> </ul>
Intangible	<ul style="list-style-type: none"> <li>- Brand value</li> <li>- Goodwill</li> <li>- Value of immaterial properties</li> </ul>
	Non-financial
Tangible	<ul style="list-style-type: none"> <li>- Delivery time</li> <li>- Quality of products</li> <li>- Production volume</li> <li>- Productivity</li> <li>- Stock turn time</li> <li>- Service volume</li> </ul>
Intangible	<ul style="list-style-type: none"> <li>- Competencies</li> <li>- Customer satisfaction</li> <li>- Customer retention</li> <li>- Innovation</li> <li>- Motivation</li> <li>- Personnel satisfaction</li> </ul>

Figure 3 - Classification of Success Factors (Lonnqvist, 2002)

Benefits can also be classified according to their degree of explicitness as financial, quantifiable, measurable or observable (Ward & Daniel, 2006). A benefit is considered quantifiable if it is possible to forecast the improvement that will result from it (Ward et al., 2008). Quantifiable benefits that cannot be measured in financial terms may be measured by tracking trends or modeling (OGC, n.d.; Ward et al, 2008). Measurable benefits are benefits that are currently being monitored and measured but it is not possible to forecast the level of improvement the change is likely to bring. Observable benefits need to have agreed measurement criteria in place and the degree to which the benefit has been realized is decided on by a group or individual, based on their experience or judgment (Ward et al., 2008). Statistical modeling can be used to derive measures for benefits where the current state cannot be used as a baseline for the future state (OGC, n.d.). Intangible, unquantifiable benefits (such as customer perception) tend to deliver little real value (Remenyi et al., 1998).

Almost all benefits (including intangible ones) are measurable if key performance indicators are identified (Bennington & Baccarini, 2004). Kaydos (1999, cited by Lonnqvist & Pirttimaki, 2006)

holds the view that whilst anything can be measured, the cost and effort involved in measuring it may not be worth the effort and cost involved, a view supported by Whittemore (2009) who suggests that intangible benefits “are not reasonable to measure”.

### **IT Value and its Assessment**

IT has become an fundamental part of organizations and its contribution to increased operational and strategic performance is acknowledged (Ashurst et al., 2008). However, for some time, there has been a growing concern that IT is failing to deliver a reasonable return (Bennington & Baccarini, 2004; Peppard, Ward & Daniel, 2007). Improved reliability of hardware and software and the use of packages means that IT projects are more likely to be delivered on time and within budget than they were previously, but despite this, they are still considered failures as they fail to deliver benefit to the organization (Ward & Daniel, 2006).

Project managers tend to focus on managing technology deliverables, scope, time and budget rather than benefits related to the use of project deliverables (Ashurst et al., 2008; Bennington & Baccarini, 2004; Smith, Dombo & Nkehli, 2008). Project stakeholders are starting to place more emphasis on when the proposed benefits of a project will be realized rather than on project schedules and budgets (Nogeste & Walker, 2008).

Predicting and managing the organizational impacts of an IT implementation is a complex process (Ashurst et al., 2008; Elbashir et al., 2008). There are a number of methods available for assessing the value of IT and there has been much debate around the definition of IT business value and the optimal approach for its evaluation (Bannister & Remenyi, 2000; Lin & Pervan, 2001(b); Silvius, 2006). An upfront justification for IT investment based solely on financial measures can provide misleading information as unrealistic assumptions may have be used to estimate benefits and the cost of organizational change requirements such as training and process redesign may be excluded (Symons, 2006; Ward et al., 2007).

Many IT evaluation approaches are ineffective as they fail to provide a clear definition of value (Bannister & Remenyi, 2000). Financial measures are based on the concept that only material goods have value (Gibson et al, 2004). Because financial measures are often used to justify IT investment, they are also used to measure its success (Ward & Daniel, 2006). CIOs cite the measurement of value and benefits amongst their top concerns (Silvius, 2006). One of the factors contributing to this challenge is the difficulty in defining the value of IT's contribution in traditional, financial terms such as Return On Investment (ROI), Internal Rate of Return (IRR) and Total Cost of Ownership (TCO). For

these reasons, evaluations are often not performed, or if they are, they are ineffective or inefficient (Lin & Pervan, 2001(a)) and IT investment decisions are often based on gut instinct or blind faith (Bannister & Remenyi, 2000). Traditional approaches which use only financial measures are now considered to provide “lagging information that is not actionable” (Lonnqvist and Pirrtimaki, 2006).

### **The IT Productivity Paradox**

The IT productivity paradox suggests that there is no correlation between IT investments and productivity or other financial measures (Lin & Pervan, 2001(b)). Bannister and Remenyi (2000) argue that it is unlikely that investment in IT would have continued to grow at the rates it has if it added no value and that the apparent productivity paradox is due to the application of inappropriate measurement techniques. If viewed from a corporate level, IT investment is often made in order to maintain or achieve a competitive advantage and the benefits may be qualitative and difficult to tie back to productivity measures. One of the factors contributing to the IT productivity paradox is that the traditional, financial formula based approaches to evaluating value overlook the intangible benefits associated with IT investment (Lin & Pervan, 2001(a)). Despite extensive criticism of these approaches in the context of IT value measurement, many organizations continue to use them as a basis for IT evaluation (Symons, 2006).

The productivity impact of technology often takes time to emerge and if assessment is made immediately after implementation, no benefit may be visible (Lillrank, Holopainen & Paavola, 2001) or it may not be what was expected (Smith et al., 2008). Benefits of this nature can be described as lagging benefits (Lonnqvist, 2002).

In order to determine the contribution IT investment makes to strategic goals, consideration must be given to the way in which IT can make an organization more effective, efficient, flexible and innovative (Silvius, 2006). The ability to derive benefits from IT investment is dependent on the organization's understanding of the benefits that can be delivered and how they are obtained (Lin & Pervan, 2001(b)). A business case should state clearly how the proposed project will contribute to the strategic objectives rather than being based on a financial approach which excludes qualitative or intangible benefits (Ward & Daniel, 2006).

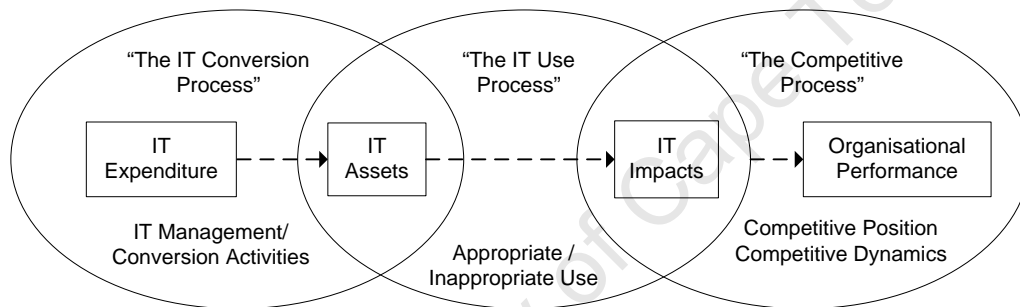
### **IT Evaluation Approaches**

Studies using a ‘variance approach’ have focused on the relationship between IT investment and organizational performance. Several of these studies concluded that no direct relationship could be found (Silvius, 2006). However, the studies did show that the organizational change which accompanies IT investment influences the return associated with it, suggesting a process approach

would be a more appropriate framework when studying IT value as it takes the time dimension into account (Silvius, 2006).

A 'life-cycle' approach to IT evaluation ensures that benefits realized after implementation are included in the measurement of business value (Symons, 2006). An evaluation lifecycle approach combines various existing measures, methods and practices which are used together to assess the value and benefit associated with IT investment over the lifetime of the system (Lin & Pervan, 2001(a)).

A process model can be used to show how IT investments add value (Silvius, 2006). Soh and Markus (1995) proposed a process model (Figure 4) as a framework for realizing the business value as it allows delayed and indirect benefits to be included, rather than just focusing on implementation of an IT solution. The model views value creation as a process (Bannister & Remenyi, 2000).



**Figure 4 - How IT creates business value (Soh & Markus,1995)**

Ward and Daniel's (2006) interpretation of the model in Figure 4 applies the strategy development terms 'means', 'ways' and 'ends' to Soh and Markus' (1995) IS/IT Conversion, Use and Competitive processes (Figure 5). The corporate objective or vision is the 'ends'; developing a strategy, the 'ways'; and using the resources available to implement the strategy, the 'means'. Seen from an IT value perspective: IT assets are the means, which have only potential value until the activities of an IT project occur and the assets are exploited (the ways) which convert the potential value to delivered value which results in the project objective (the ends) being achieved and value being realized as a result (Ramdani, 2009).

The value creation process shown in Figure 5 begins with value initiation or the acquisition of IT assets which may be applications, infrastructure, data, the contracting of human resources, the creation of processes or the establishment of internal and external relationships. Value conversion

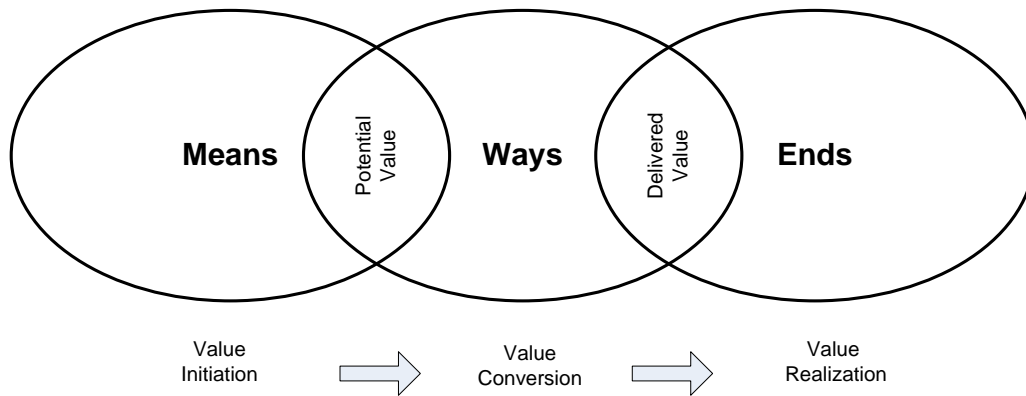


Figure 5 - How IT creates business value - adapted from Ward and Daniel, 2006; Ramdani, 2009

occurs as the potential value that those assets hold is converted to actual or delivered value.

Initially, conversion would typically be achieved through the activities of an IT project but potential value may remain in the asset and ongoing activities such as optimization and regular review and assessment of the asset base may yield additional value. Value realization is the result of combining value initiation and the value conversion and can usually be expressed as strategic value (competitiveness, effectiveness or return on assets), tactical value (improved relationships with trading partners) or operational value (improved efficiency or quality, cost savings) (Ramdani, 2009).

Composite approaches to the measurement of IT value combine a number of individual measures to produce a 'balanced' view using weighting and scoring schemes (Bannister & Remenyi, 2000).

Balanced approaches allow for the inclusion of financial, non-financial, tangible and intangible measures (Lonnqvist, 2002).

### Dissatisfaction with Explanations of IT Value

There are three concerns that could lead managers to question the value of IT in an organization: high and increasing IT spend, a history of poor delivery and management's expectations as to the role IT should play (Le Roux, 2001). The concept of IT value is complex as stakeholders may have differing views as to what IT value is or should be as well as the difficulties identifying and measuring the benefits that can be attributed to IT. IT value is also difficult to explain as business managers often have a limited understanding of IT matters and how IT could benefit them and consider IT a commodity or a service rather than a critical business resource.

Le Roux (2001) suggests that in order to overcome dissatisfaction it is necessary to understand the reasons why management is concerned about IT value. However, the biggest problem with the evaluation of IT value is not the method used for the evaluation but rather the "lack of an agreed definition of IT value" (Le Roux, 2001).

### **The Role of the Business Case**

A business case is used to justify investment and its components should include a cost benefits analysis and a benefits realization plan (OGC, n.d.). Risks, costs and benefits all need to be considered when formulating a business case in order to create focus on anticipated outcomes and benefits which in turn helps to ensure that the actual results are monitored and compared to the expected results (Moss & Atre, 2003; Oco, Inc, 2007). Costs and benefits change over time and a business case document needs to be updated accordingly (OGC, n.d.). The costs associated with business change can be unpredictable and difficult to quantify (Ward et al., 2008).

Many organizations struggle to produce comprehensive business cases for IT investment (Ward et al., 2008). The complexities of attaching a value to qualitative benefits makes building a business case for a BI initiative more challenging than for other types of IT investment (Groh, 2004). The apparent failure of IT projects to deliver the benefits proposed in a business case is often due to the fact that the benefits in the business case are overstated (to ensure the project get approved) and never actually achievable (Ward et al., 2008). An effective business case needs to take all types of benefits (including intangibles) into account and provide measurement criteria and an owner for each benefit.

### **The Value of BI**

BI is not just IT, although IT plays an important role as an enabler of BI (Venter & Tustin, 2006). Like IT, BI has no inherent value and the value is derived from the actions initiated based on it (Lonnqvist & Pirttimaki, 2006). Pirttimaki (2007, p9) suggests that “BI is more like a management philosophy or managerial tool and technology is indeed an enabler of BI”. Justification for BI initiatives must be business-driven, not technology driven (Moss & Atre, 2003). In the same way that the value realized from IT investment is dependent on how the resources are utilized, the business value of BI is dependent on management processes existing to ensure that operational processes utilize the information delivered (Williams & Williams, 2007). ROI in BI comes through having faster access to better quality data and improved processes that increase revenue and decrease costs but the costs and benefits associated with the investment need to be understood (Groh, 2004; Ranjan, 2008; Whittemore, 2009). Traditional IT evaluation techniques may not be effective for measuring BI (Gibson et al., 2004). If the value of BI is to be determined, the costs associated with BI need to be measured as well as the benefits realized (Lonnqvist & Pirttimaki, 2006).

Elbashir et al. (2008) describes BI benefits in three groups related to business processes:

1. Business supplier / partner benefits which include the benefits the organization realizes from improved relationships with suppliers such as reduced transaction costs and supply chain improvements
2. Internal efficiency benefits which arise from the optimization of internal processes - including a reduction in operational costs and improved staff productivity
3. Customer intelligence benefits which are realized as a result of enhanced insight into customer behavior such as buying preferences and patterns and customer segmentation

These business process related benefits contribute to overall organization performance indicators such as increased revenue and increased competitive advantage.

The benefits that BI will deliver are different for each organization as the intelligence within the organization is unique (Moss & Atre, 2003). The value of having access to information used to make a decision may not be apparent until the impact of the decision is known – which may only be after a prolonged period of time (Bannister & Remenyi, 2000). A BI report may indicate an area where sales could be increased, but realizing the value linked to that intelligence is dependent on a sales agent taking action based on the information (Whittemore, 2009). Thomas (2001, p. 48) suggests that the goals of BI are to “avoid surprises, identify threats and opportunities, understand where your company is vulnerable, decrease reaction time, out-think the competition and protect intellectual capital”. Other intangible benefits associated with BI initiatives include enhanced operational processes efficiency, increased business knowledge, regulatory compliance and more productive relationships (Gibson et al., 2004). In a survey of Finnish companies performed by Hannula and Pirttimäki (2003), expected benefits cited included “harmonizing the ways of thinking of company personnel” and “broadening understanding of business in general”.

Data from any number of disparate sources needs to be turned into consistent information that can be used across business units and divisions (Ranjan, 2008). If BI is to add value through interpretation and presentation of usable information, the focus needs to be on intelligence and not just gathering and disseminating data (Venter & Tustin, 2006). The fact that enhanced knowledge availability often takes time to translate into measurable returns makes it difficult to connect the actual return to the underlying information used to achieve it (Gibson et al., 2004; Rouble-Flores & Kulkarni, 2005).

### **BI Strategy and Strategic Alignment**

Strong alignment between business and IT results in closer working relationships between the teams and leads to the development of more effective systems and the establishment of IT capacity which

can support the long-term, strategic goals (Byrd, Lewis & Bryan, 2006). Similarly, alignment between the BI strategy and the overall business strategy provides a link between BI investment and strategic business goals. Consideration must be given to how any BI initiative will contribute to addressing a strategic goal (Venter & Tustin, 2006).

A BI strategy needs to be defined to ensure that BI is not implemented in a haphazard way (Gonzales, 2004). Without a cohesive BI strategy an organization is likely to spend more time and money resolving issues related to governance, people and data than building and delivering solutions that support its BI goals which will have a negative impact on benefit and value realization (Kowalke, 2007).

The BI strategy should address data storage, strategic, tactical and operational business needs and how BI can be used to address them, BI architecture and the implementation approach to be followed (Daniel, 2007). Gonzales (2004) suggests that a BI strategy document should contain four components:

- Conceptual view – the overall goals and objectives of BI and a diagram that shows all components that will be incorporated in the long-term BI vision
- Data architecture – shows how data structures will be implemented, stored and shared in the warehouse environment
- Technical architecture – this section focuses on the physical components of the BI environments such as hardware and software products to be used
- Implementation view – guidelines for building and maintaining the BI environment from three perspectives:
  - Strategy – timing, priority, resourcing and funding for BI projects
  - Architecture – performance requirements, data quality, retention and meta data management
  - Process – archiving, backup and restore processes, frequency of updates and security

The BI strategy should identify a sponsor for BI in the organization – ideally an executive who is not responsible for IT and who has a good understanding of the company's objectives, strategies and goals and the key performance indicators that support these (Daniel, 2007). This sponsor should ensure that there is support for BI projects as well as raising the profile of BI within the organization (Venter & Tustin, 2006). Although BI projects require extensive support from IT resources, the projects and requirements should be owned by business and solutions developed in response to



business needs, not IT requirements (Griffin, 2007). IT is responsible for delivering the tools that allow business users to make use of the information but deciding how and for what the information is used is the responsibility of the business teams (McGillicuddy, 2007).

### **Measurement of the Business Value of BI**

There are two aspects of BI that should be measured – the value attributed to BI and BI process activities (implementation and use of BI products and services). BI research has focused predominantly on measuring the effects of BI rather than on managing the BI process (Lonnqvist & Pirttimaki, 2006). The metrics associated with the BI process are easier to measure than those needed to assess the effects of BI.

If BI is considered to be a business activity like any other business process, business performance measurement techniques can be applied to BI processes (Lonnqvist & Pirttimaki, 2006). However, Whittemore (2009) suggests that data warehousing and business intelligence do not provide a direct, measurable return. In a survey undertaken by Alter (2007, p48), 72% of respondents said that BI efforts have had a major and measurable impact on profitability and 57% of organizations felt that they were good at accessing the strategic value of the information delivered by BI. However, no evidence was offered as to how the measurement was performed.

“There is a complete absence of a specific and rigorous method to measure the realized business value [of investment in BI systems], if any” (Elbashir et al., 2008, p135). There has been little academic research into BI and whether the characteristics of BI are sufficiently different from those seen in IT in general, especially with regard to intangible benefits, to warrant alternative evaluation approaches (Gibson et al., 2004). Part of the challenge of measuring the business value of specific types of IT lies in understanding the qualitative and quantitative benefits and performance measures of the specific type of technology. There is a need for a performance measurement that can be applied to BI systems specifically (Elbashir et al., 2008; Lin & Pervan, 2001(a)). Such a measurement should take into account the context in which BI is being used as well as the management objectives for BI and the BI systems and capability being used (Elbashir et al., 2008). An effective evaluation approach for BI needs to go beyond costs and benefits and take the opportunities that are presented by the technology into account (Gibson & Arnott, 2005).

Evaluation approaches for BI have been proposed by BI vendors and although these approaches acknowledge the role played by intangible, indirect and delayed benefits, the focus remains on ROI or TCO calculations to justify up-front investment (Raden, 2004; SAS, 2006). Consulting company Oco, Inc. (2007), proposes a framework for ROI analysis of BI Applications which considers business value, BI user productivity, IT effectiveness and total cost of ownership (TCO). However, other than TCO, little advice is offered as to how the value of these contributions should be determined.

Whittemore (2009), a BI consultant, acknowledges that traditional ROI approaches exclude intangible benefits and the need for post project review and measurement against original values. Whittemore's (2009) step-by-step approach for determining ROI for BI includes a step to identify and quantify intangible benefits but does not specify how they should be measured. A ROI calculation should be part of a bigger process that takes business objectives, priorities, risk and feasibility into account and that process is more important than the actual ROI number (Groh, 2004).

Counihan, Finnegan and Sammon (2002) propose a framework for evaluating data warehouse projects that includes the identification and measurement of intangible benefits. The main problems with applying traditional IT evaluation methods to data warehousing projects are identified as: evaluating intangible benefits, making the relationship between IT and profitability explicit, dealing with the organizational impacts of the changes that might arise as a result of having better access to information, the extended timeframe over which the benefits will be realized and evaluating the underlying infrastructure investment (Counihan et al., 2002). Following case study research in four UK organizations, a framework is proposed that aims to address these problems through two high level analysis techniques (economic environment analysis and information intensity analysis) and four management processes (commitment and sponsorship, evaluation approach, time scale of benefits and appraisal techniques). The data warehouse environment poses similar challenges to BI and this approach should be tested in a BI situation (Gibson et al., 2007).

### **Using Process Models for the Evaluation of BI**

Crossland (2007) used the process model proposed by Soh and Marcus (1995) and adapted by Marshall, McKay and Prananto (2004) to study the realization and measurement of BI in a South African financial services organization. The adapted model (Marshall et al., 2004) added the IT alignment process to the original model to include strategic alignment in the model. There is a need for BI to be closely aligned with business strategy (Alter, 2007; Ranjan, 2008). The model was extended (Figure 6) to include a benefits realization management process in order to ensure the

inclusion of the delayed, intangible and indirect benefits and their role in creating value (Crossland, 2007).

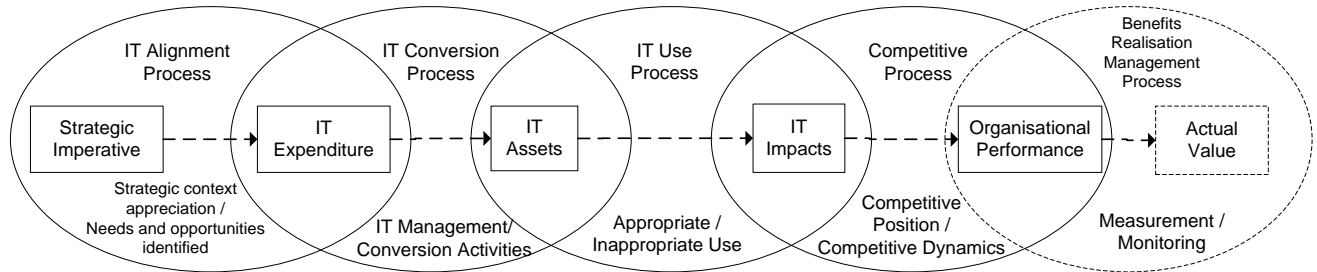


Figure 6 - Extended Process Model (Crossland,2007 - adapted from Soh & Markus (1995), Marshall et al.(2004))

The study concluded that the business value that is realized as a result of investment in BI is linked to activities which occur throughout the BI process and links and dependencies between tasks in the different processes have an impact on overall value realization. Including a process which focused on the management and measurement of the benefits emphasized the importance of formal benefits measurement if investment in BI is to be justified (Crossland, 2007).

Gibson and Arnott (2005) used Symon's (1991) theory of content, context and process (CCP) as a framework for their study of BI evaluation in an Australian financial services organization as it allows for the analysis of intangible factors excluded from traditional, financially-based approaches. The CCP model considers what is being measured, why it is being measured and how measurement is being performed. The study found that although there was little evidence of formal post implementation measurement of BI, there was an implicit understanding of the value BI was adding to the organization – evidenced by the organization's ongoing commitment to BI.

A process centric approach to benefits realization in BI can assist managers in making decisions that support improved tactical and strategic results (Ranjan, 2008). BI has an impact on business process performance as well as organizational performance and studying benefits at business process level provides insight as to how the value is created at organizational level (Elbashir et al. (2008).

"Implementing smarter business processes is where BI influences and affects the bottom line" (Ranjan, 2008, p468). Porter's (1985) value chain was used by Elbashir et al. (2008) as a framework for a study which found that the 22 performance measures used by the 212 organizations surveyed could be grouped into organizational measures and three categories of business process measures - supplier/partner relationship benefits, internal process efficiency benefits and customer benefits. The business process measures can be mapped to Porter's (1985) value chain activities of inbound

logistics, operations and customers and provide insight as to why organizational level benefits have not been realized. The organizational level measures are used to indicate whether the desired performance benefits have been achieved at an organizational level (Elbashir et al., 2008).

### **Balanced Views of Performance**

A Balanced Scorecard evaluates an organization's performance from four perspectives: customer, financial, internal business and innovation and learning (Kaplan & Norton, 1992). Performance measures are usually based on the vision and strategy of the organization and success factors are drawn from various perspectives (e.g. customer). Measurement is based on a limited set of critical success factors and the measurement system takes the causal links between the success factors into consideration (Lonnqvist & Pirrtimaki, 2006). A Balanced Scorecard approach can be used to measure benefits if a project aims to achieve a mix of tangible and intangible benefits (Nogeste & Walker, 2005; OGC, n.d.).

The Performance Prism is described as a "second generation" performance measurement framework (the Balanced Scorecard being the first generation) which addresses the priorities of the "New Economy" (Neely, Adams & Crowe, 2001). The Performance Prism considers five interrelated aspects: stakeholder satisfaction, strategies, processes, capabilities and stakeholder contribution.

A balanced performance measurement framework is appropriate for BI because it considers multiple perspectives (Petrini & Pozzebon, 2004). Lonnqvist and Pirrtimaki (2006) suggest that as BI is an activity or process like any other business activity, business performance measurement methods such as the Performance Prism can be applied to it. A Performance Prism view of the BI Process would consider the success factors within the steps as follows (Lonnqvist and Pirrtimaki, 2006):

1. Stakeholder Contribution – the users of intelligence and the financial sponsor of BI activity are identified as the key stakeholders. Contribution includes adequate resourcing and managerial support for BI
2. Strategies – the BI strategy needs to consider how the goals of the stakeholders can be achieved.
3. Processes – a typical BI process would include steps such as identifying information needs, acquiring data, analyzing information and the storage and utilization of information. The measurement criteria within each phase would include measures such as the reliability of the information gathered, the efficiency of the process used to identify needs and the accuracy and quality of the product delivered.

4. Capabilities – the capabilities required to facilitate the BI process include the availability and competence of resources and the suitability of technology
5. Stakeholder Satisfaction - satisfaction for users would come from the availability of accurate, timeous and relevant information and the identification of the information needs of the stakeholders. Satisfaction for the financial sponsor would come from the realization of benefits and low BI costs.

Performance measures must then be identified for the success factors within each step. The measures can be direct or indirect (such as utilization of intelligence) and objective or subjective (e.g. user satisfaction surveys) (Lonnqvist & Pirttimaki, 2006).

### Benefits Realization Management

IT implementations often result in significant organizational change including changes to processes, structure and performance of individuals and the organization (Ashurst et al., 2008). These changes often fail to materialize due to the organization's inability to predict and manage the change associated with IT implementation and as a result, the proposed benefits are not realized as the benefits of IT implementation are typically of an indirect nature. Up-front assessment and post-implementation reviews are important parts a project management approach but they do not ensure that the promised benefits are delivered (Lin & Pervan, 2001a).

Benefits Management is "the process of organizing and managing such that the potential benefits arising from the use of IS/IT are actually realized" (Ward & Daniel, 2006). Benefits management aims to ensure that the desired business changes associated with a project are identified, are measurable and worthwhile and are ultimately monitored and achieved (OGC, n.d.). Benefits management differs from traditional approaches as it places long-term emphasis on the association between change and benefit as well as the need for benefit ownership and explicit benefit measurement (Ward & Daniel, 2006).

A key feature of the benefits management approach is benefit ownership. Each identified benefit should have a benefit owner and a change owner assigned to it (Ward & Daniel, 2006). The benefit owner is the person who gains the most benefit from the implementation of the project and the change owner is the person accountable for the implementation of the change. The benefit owner needs to play an active role in the project. Primary ownership of the benefits management process should lie with the business unit that will ultimately benefit from the proposed implementation but IT resources have a significant role to play in the process (Ashurst et al., 2008; Remenyi et al., 1998).

### Benefits Management Approaches

There are a number of different benefits management approaches, such as Benefits Management (Ward & Daniel, 2006), Active Benefits Realization (ABR)(Remenyi et al., 1998) and the UK Office of Government Commerce (OGC, n.d.). Most are iterative, acknowledge the need for clear ownership and share the same basic concepts of identifying, planning for, realizing and reviewing benefits (Bennington & Baccarini, 2004; Viklund & Tjernstrom, 2008).

Benefits identification can be challenging as benefits can change over time and are often intangible and complex (Bennington & Baccarini, 2004; Smith et al, 2008). One approach is to focus on broad objectives to derive key outcomes which can then be analyzed and expressed as benefits (OGC, n.d.). The proposed benefits and their business measures should be identified as well as the linkages between the technology and business changes and the overall business impact of the change (Ward & Daniel, 2006). Focus on identifying business benefits tends to be at its highest at the beginning of a project but this is often in order to get funding authorized rather than with a benefits management goal in mind (Ashurst et al., 2008). ABR uses the concepts of 'pictures' to group benefits and describes the proposed benefits in terms of a business picture, a financial picture and a project picture (Remenyi et al., 1998).

Benefits Realization Planning must occur prior to final approval and forms part of overall project planning (Bennington & Baccarini, 2004). Ownership of each benefit is assigned to the business and a benefits realization plan is developed giving consideration to the stakeholders and the tasks and changes involved (Ward & Daniel, 2006). The benefits plan should indicate where in the business the benefit will occur, what actions are required to realize the benefit, who is responsible for delivering the benefit and when it is likely to occur (Bennington & Baccarini, 2004). A benefits realization plan should exist in its own right but a summarized version should form part of the business case (OGC, n.d.).

Benefits Monitoring is the process of ongoing monitoring to ensure that the any changes (internal and external) included in the benefits plan have occurred (Bennington & Baccarini, 2004). The business measures identified in the benefits realization plan are used to evaluate the outcomes of the project (Ward & Daniel, 2006). Ideally, all benefits should be tracked but care needs to be taken around the level of detail applied to individual benefits (OGC, n.d.). Benefits monitoring is often overlooked due to a lack of business awareness and a focus on project delivery rather than benefits realization (Bennington & Baccarini, 2004)

Benefits Realization review is the assessment of the outcomes of the project against the benefits plan (Bennington & Baccarini, 2004; OGC, n.d.). Further benefits may be identified based on the outcome of the results review and a plan should be developed for the realization of these additional benefits (Ward & Daniel, 2006). Benefits should continue to be identified and tracked after the close of a project with business owners taking responsibility for ongoing measurement and realization (OGC, n.d.). Benefits realization reviews are often not performed as the benefits are difficult to identify, project success is measured in terms of project delivery, resources are immediately allocated to new projects and it is seen as a business responsibility, not an IT one (Bennington & Baccarini, 2004).

Ashurst et al. (2008) suggest that in addition to a benefits management process, organizations require benefits management capability in order to realize the true value of IT investment. An organization's ability to maximize the benefit realized as a result of IT investment is dependent on benefits planning, benefits delivery, benefits review and benefits exploitation competences.

### **Benefits Dependency Networks**

The Benefits Management approach (Ward and Daniel, 2006) uses a benefits dependency network model (Figure 7) to illustrate the link between IT enablers and business objectives in a way that includes indirect, delayed and intangible benefits.

The benefits dependency network builds the link using enabling changes and business changes to achieve business benefits which can be linked to investment objectives. The business drivers and the investment objectives should be clearly stated in the business case (Ward et al., 2008). Lillrank et al. (2001) use a similar Effect-Enabler map to illustrate how value is realized as a result of improved information availability and processes by connecting IT functions and three types of benefits: customer perceived value, cost savings and business option values through a network of enablers or effects. The benefits network model proposed by the OGC methodology documents the relationship between enabling benefits that occur before a group of intermediate benefits which are linked to end benefits (OGC, n.d.).

Nogeste & Walker (2008, p 281) propose that there is a link between intangible project outcomes and tangible product outputs and suggest an "Outcome Profile Template" as a tool to assist stakeholders in identifying intangible project outcomes and aligning them with tangible project



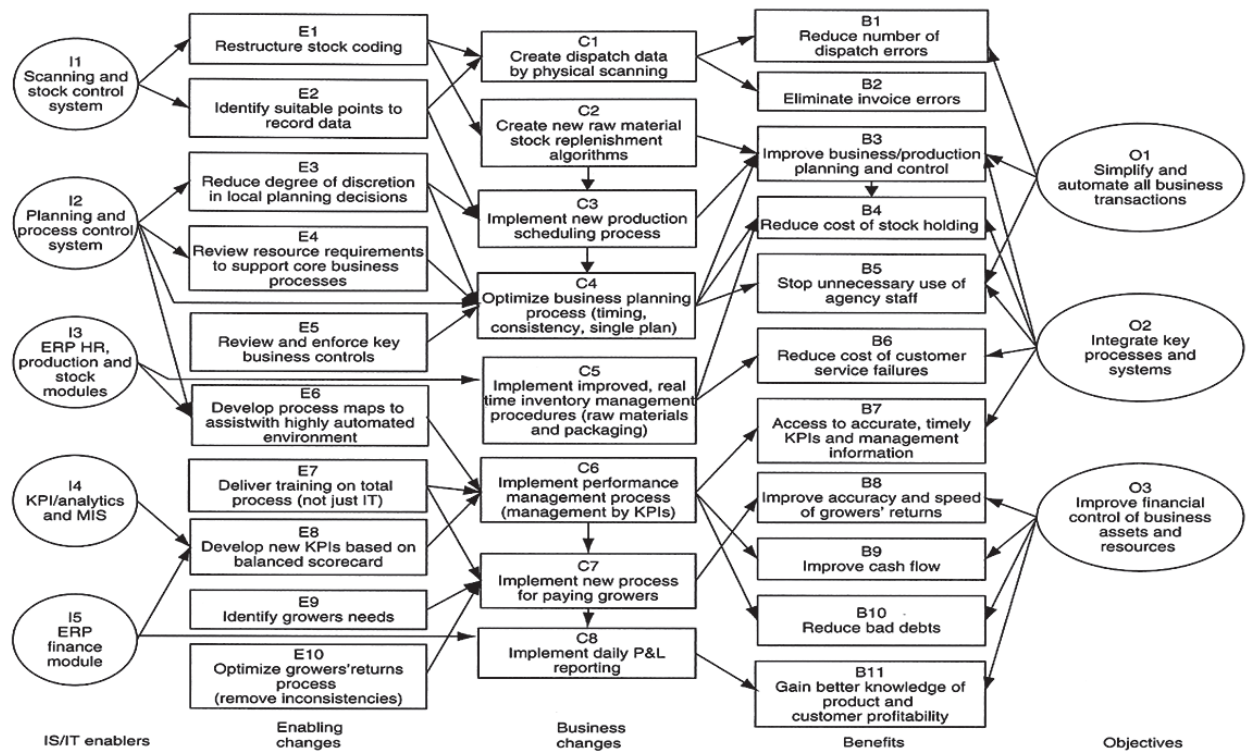


Figure 7 - Benefits Dependency Network (Ward & Daniel, 2006)

outputs. The template documents information about intangible, expected outcomes including a description, time frame for realization, the owner, the benefits and risks.

## Chapter Summary

There are varying opinions as to exactly what constitutes BI but it can be seen, in broad terms, as the process of turning data into information and knowledge (Haag et al., 2008; Venter & Tustin, 2006). Organizations are now looking to BI to help them reduce costs and increase revenue (Corcoran, 2008). There is a need for further research into how BI is adding value to South African organizations (Venter & Tustin, 2006).

Whilst BI remains a priority for many organizations, measuring the business value that it adds still poses a number of challenges. BI has no inherent value and the value is derived from the actions initiated based on it (Lonnqvist & Pirttimaki, 2006). BI evaluation is complex due to the intangible, indirect and delayed benefits that can be attributed to BI and requires evaluation methods that look beyond the traditional financial calculations. Benefits management offers a structured framework for measuring these types of benefits. Unless the benefits associated with BI are correctly identified,



monitored and measured, BI initiatives will not receive appropriate levels of support as the possible returns will not be accurately stated (Gibson et al., 2004). Consideration needs to be given to the fact that typical IT evaluation approaches may not be suitable for BI and alternative approaches need to be explored.

The true value of BI will be realized when organizations use BI to address the questions that can be answered by the higher end analytical components of BI (Davenport & Harris, 2007). Organizations are “shortchanging” themselves by failing to take advantage of opportunities that exist for them to transform data into knowledge and strategic value (Davis et al., 2006, p11).

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## Chapter 3 – Research Methodology

### Research Objectives

It has been suggested that the widely held view that unless the benefit from investment in IT can be effectively measured and monitored, it will not be realized (Reiss et al., 2006), may not always apply in the case of BI (Gibson et al., 2004) and that alternative approaches for evaluating the contribution made by BI may be appropriate (Crossland, 2007, Gibson & Arnott, 2005). The primary objective of this research has been to gain generalizable insight into the ways organizations derive business value from their investment in BI technology and how this is measured and managed. The secondary objective of this research was to examine what steps these organizations take to maximize the potential value of their BI assets.

### Research Questions

The research questions in this study pertain to BI business value realization, measurement and optimization and can be formulated as follows:

1. *How is BI adding value to organizations in South Africa?*
2. *What processes and methods are being used for the evaluation of the business value that BI delivers and what challenges have been encountered?*
3. *What approaches are being used within these organizations to maximize the potential benefit that can be realized from the investment that has been made in BI?*

The first question examines how BI is being used within each organization, the importance that is placed on BI and how it contributes to the realization of strategic goals. Question 2 explores the steps taken to measure the effectiveness of BI activity, and in particular, the organization's views on the need for specific benefits management and measurement. Question 3 allows the researcher to gain insight into the steps being taken to make optimal use of the investment in BI.

## Research Methodology

### Purpose

Exploratory studies are appropriate when the objective of the research is to gain new insights into a phenomenon and where there has been little prior empirical research into the topic (Saunders, Lewis & Thornhill, 2007). The purpose of this research is exploratory as it examines aspects of the value of BI, a topic for which there has been limited prior research.

### Underlying Philosophy

The study is qualitative as is based on the analysis of non-numeric data. The study is cross sectional as it presents a view of a phenomenon at a particular point in time (Saunders et al., 2007).

The research approach is primarily inductive, though the use of an established framework means that it can also be considered to have a degree of deductive epistemology. It can be seen as inductive as it examines a lightly researched area and aims to develop new theory based on the analysis of empirical data (Saunders et al., 2007).

The philosophy of the research is plurist - both positivist (as it involves the “empirical testing of a research model”) and interpretivist (as it would seek to gain “knowledge of reality” through the study of interviews and/or documents) (Ashurst et al., 2008, p. 357).

A multiple-case study strategy was used to ensure that a variety of organizational perspectives are explored. A case study approach is appropriate for exploration of areas where there is a limited amount of existing knowledge and where a phenomenon can be studied in its real-life context (Yin, 2003).

### Approach to Theory

The use of a process model as a framework for studying the realization of business value in a variety of IS contexts has been validated by a number of previous studies (Marshall et al, 2004; Radhakrishnan, Zu & Grover, 2006; Scheepers & Scheepers, 2008). Crossland (2007) used an extended version of the Soh and Markus (1995) model to study BI and business value realization and concluded that all five processes played a role in the realization of business value from investment made in BI.

Ramdani (2009) proposes using the model in Figure 5 as a basis for a study entitled ‘Realizing Business Value from IT assets’ as it provides a framework that categorizes the entire value creation process associated with business value realization and IT. The same model was used as a framework for this study as the value creation process for BI is well represented by the model. The ‘Means’ in the BI context includes data, managerial and technical knowledge, relationships with vendors, internal relationships, BI processes, BI services, BI applications and the BI infrastructure. The ‘Ends’ are mainly the same as those stated for value realization from IT assets: competitiveness, effectiveness, return on assets, efficiency, productivity, improved quality and cost savings (Ramdani, 2009). The ‘ways’ are the actions that are needed to convert the potential value of the assets (means) into the realized value and desired outcomes described by the ‘ends’. The research

questions this study seeks to answer will provide insight into what the 'Ways' are in this process and what is needed to convert the assets into value.

The findings of Crossland (2007) suggest that the activities occurring in the Alignment process (Marshall et al., 2004) and the Benefits Realization Management process should also be examined as they make a significant contribution to the value BI delivers.

## Research Strategy

### Sampling Strategy

A purposive sampling strategy is used to capture appropriate data by focusing on organizations that are using the focal technology (Elbashir et al., 2008). The sampling approach in this study was purposeful and aimed to identify organizations using BI in the Western Cape. Candidates considered suitable for interviewing were CIOs and/or individuals in a senior BI management role. The study was limited to organizations in the Western Cape due to limited time and funding.

In order to produce a generalized view, semi-structured interviews were sought with senior managers involved in the setting of BI strategy and/or the delivery of BI from companies in a variety of industries, including retail, financial services, media, petrochemical and telecommunications.

**Table 1 - Profile of interviewees for semi-structured interviews**

Interviewee	Industry	Job Title / Role / Responsibility
I1	Insurance	Strategic Architect
I2	Insurance	Information Management Manager
I3	Retail	Manager of Business Intelligence Unit, including competitor analysis and customer research
I4	Telecomms	Customer Warehouse Manager
I5	Petro-Chemical	CIO
I6	Financial Services	Risk and Analytics Executive
I7	Retail	BICC manager and senior manager responsible for BI
I8	Retail	CIO and senior manager responsible for BI
I9	Media	CIO

### **Data Collection and Preparation**

Qualitative interviews are one of the most important tools for gathering data in qualitative research (Myers & Newman, 2006). A degree of structure is necessary to ensure consistent data is collected but semi-structured interviews allow the researcher some flexibility to explore interesting topics that may arise during the interview and to draw information out of the interviewee. Qualitative data was collected through a series of semi-structured interviews with suitable interviewees at appropriate organizations.

Word of mouth, internet searches and direct contact was used to identify the most appropriate person to be interviewed at each organization. Telephonic contact was used to schedule the interviews with a follow-up email sent as confirmation (Appendix A). An outline of the interview questions (Appendix B) was attached to allow participants to prepare for the interview.

Face-to-face interviews were conducted by the researcher and recorded using a digital audio recorder with permission having been given by the interviewee. The audio recordings were transcribed and validated against the recordings. Secondary sources of data, such as company documentation and diagrams to support answers given in the interviews were gathered where possible.

### **Research Instrument**

The semi-structured interview questions were set out in a prepared guideline document (Appendix B). The Ward and Daniel (2006) and Ramdani (2009) view of the process model (Figure 5) was used as a guide for compiling the interview protocol as the framework it provides would ensure that the information necessary for addressing the research questions was obtained. A pilot interview was done with an interviewee who had previously worked in a role similar to the individuals being targeted for the study. As a result, two questions were removed and others re-worded based on the feedback received.

The questions included in the interview protocol were based on those used in the studies done by Crossland (2007) and Ramdani (2009). Questions relating to BI value realization in the context of the means, ways and ends processes were included as well as questions relating to the current strategy adopted by the organization, the approach to value measurement and the steps taken to ensure maximum business benefit is derived from the investment in BI.

### Data Analysis

Thematic analysis was used to analyze the transcribed interview data. Thematic analysis is a qualitative data analysis method used to find themes which are significant to the description of a phenomenon. A hybrid approach, making use of both data driven, inductive (allowing codes to emerge from the data) and deductive (using a priori template codes based on a framework or model) approaches was used (Fereday & Muir-Cochrane, 2006).

For the deductive coding, a code manual was developed based on the model in Figure 5 and the interview questions. Codes were identified based on the three research questions which this research aims to address, the three sections of the model (means, ways and ends) and the interview questions.

The interview transcripts were coded by attaching the codes (see Appendix D) from the code manual to relevant, meaningful units of text. For the inductive portion of the coding, the interview transcripts were studied and new codes identified and coded.

The codes were then reviewed to identify relationships between codes to identify patterns or themes in the data. The themes that emerged were examined and validated to confirm that they were representative of the codes used to create them. Key themes, patterns and relationships were then identified and explored.

### Expected Results

It was expected that most organizations would be found to be facing significant challenges measuring the value attributable to BI. The organizations included in the sample were all known to have established BI programs and it was expected that BI would be playing a role in many parts of the organization but that BI efforts would be decentralized and competency centers would not be common. Based on prior research (Crossland, 2007), it was expected that organizations would be prepared to accept that if BI was being used, it was adding value, even if they were not entirely comfortable with not being able to measure it.

### Limitations of Research

Case study research requires multiple sources of data for triangulation. Whilst the interviewees were comfortable discussing their organization's approach to BI value management in an interview, few were prepared to provide company documents to be used to supplement the interview

transcripts due to the often strategic nature of BI projects. Supporting documents were received from three of the nine interviewees.

Although the sample included organizations from a number of industries, it was limited to commercial entities and did not include charitable, public sector or academic institutions. The limitation of the study to organizations based in the Western Cape is not considered a limitation in achieving a view that is generalizable to BI in South African organizations as the nature of BI value is unlikely to differ in geographical regions within the country.

### **Access and Ethics**

As BI is considered to be a strategic initiative that enhances competitive advantage, it is necessary to keep the identity of the individuals and organizations participating in the study confidential. Consent to record the interviews was obtained from the participants and a standard permission acknowledgement statement was read to interviewees at the start of each interview (Appendix C). Codes were used to identify participants and organizations once the interviews had been transcribed.

### **Chapter Summary**

The research methodology was based on multi-case study research approach using semi structured interviews to obtain qualitative data. The IT Value process model (Figure 5) was used as a framework for the research as value creation process associated with BI is well represented by the model. Inductive and deductive themes were coded for in the data and the following chapters describe the findings that emerged from the analysis of the coded data.

## Chapter 4 – Findings

The model in Figure 8 was used as a framework for the analysis of the data collected in the interviews. The sub-themes identified were grouped into themes according the model's "Means", "Ways" and "Ends" structure with additional themes emerging for supporting concepts.

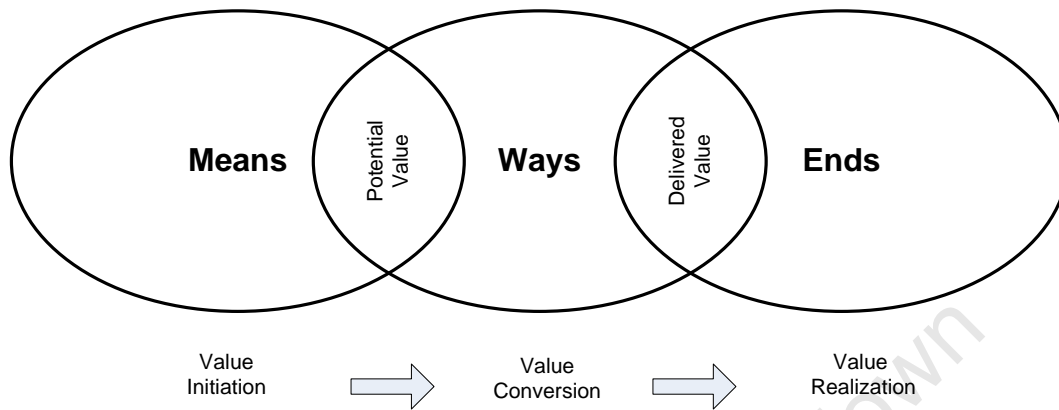


Figure 8- How IT creates business value - adapted from Ward and Daniel, 2006; Ramdani, 2009

Additional themes identified during the data analysis were:

- Strategy – this theme is used to examine the organization's approach to BI strategy and the alignment of that strategy with a wider IT strategy and the over-arching business strategy of the organization
- Organization Structure and BI Ownership – an emergent theme based on responses to interview questions relating to how BI fits into the organization's structure and who is ultimately responsible for what BI delivers to the business
- The Value of BI – this theme was used to document in which areas of the business BI is being used and how the interviewees view the contribution that BI makes to the organization they represent
- Measurement of the Value of BI – the widely held view that it is unlikely that any benefit will be realized from an investment in IT assets unless it can be effectively measured and monitored (Reiss et al., 2006) needs to be considered in the context of BI. This theme is used to examine where the value of BI is being measured and the approaches and tools the respondent organizations are using
- BI Challenges and Success Factors – the model and the themes above provided the structure necessary for examining the current BI environment at the participating organizations, but an additional theme emerged that could be used to study the challenges the interviewees



face if they are to realize the full benefit of their investment in BI and what steps they believe can be taken to ensure success

### Theme 1: Strategy

Marshall et al. (2004) proposed adding an additional process called the “Alignment Process” to the Soh and Markus (1995) model to recognize that a strategic focus for IT investment was required to complete the connection between business strategy and organizational performance. Crossland (2007) identified the definition and adherence to a BI strategy as an important contributor to BI business value realization. Based on this, questions relating to strategy were included in the interviews and analyzed as a separate theme from value initiation.

Five of the interviewees in this study confirmed that a BI strategy is in place in their organization, two of the organizations did not have one, one was in the process of defining a BI strategy and one of the interviewees was unclear about the status of a BI strategy in that organization. The three interviewees whose organizations did not have a BI strategy in place currently, acknowledged the need for one.

Interviewee I1 suggested that a BI strategy should have six facets to it: data management, information management, BI business, BI technology and data warehousing and funding. Data management and information management differ in that data management focuses on the data used in the BI process and information management considers the BI product. The business should articulate its BI priorities, standards and agendas through the BI business strategy. The BI technology strategy is used to ensure there is synergy in the implementation of BI tools, platforms and products across the organization. The six facets are interdependent and all need to be defined or an organization will struggle to make architectural and funding decisions and choices. These sub-strategies and their focus areas suggested by I1 are in agreement with Gonzales’ (2004) recommendations for defining a BI strategy. I3 saw a BI strategy as being comprised of three components: information management (which focuses on the data warehouse), information delivery and BI governance.

The need for alignment between the BI strategy, the IT strategy and the overall organization strategy was understood and I5, I6 and I7 all had BI strategies that they claim are integrated or aligned with the IT and organization strategy. I9 described BI strategic alignment within his organization as follows:

*“We’ve put together a BI strategy which largely looks at the business strategy, but also at the IT strategy. There are a number of pillars that the IT strategy has and we’ve essentially aligned our BI strategy with the IT strategy which is around operational excellence, around enabling the business and there are a number of other pillars. We’ve taken our BI strategy and aligned it to the IT strategy which is aligned to the business strategy.”*

Once a well aligned BI strategy has been defined and implemented, I6 believed that a point can be reached where BI no longer only supports and enables company strategy, but also becomes a strategic driver:

*“BI is actually mapping out strategic imperatives and the strategic KPIs and then is holding the organization, on a dynamic basis, accountable for the realization of those goals. So BI becomes then a compass almost, not just reflecting back progress, but actually enabling the organization to make adjustments along the course of its stated intention so that it arrives at its output.”*

Whilst not all the organizations have a defined and documented BI strategy, the respondents all saw the need for one. Examples were provided as to how the BI strategy, when in place, was aligned to both IT and organization strategy. I6 illustrated how a well defined BI strategy can become a driver, rather than just an enabler, of the overall organization strategy.

## **Theme 2: Organization Structure and Ownership of BI**

Daniel (2007) includes the identification of an executive-level sponsor as one of the key issues to be addressed when defining a BI strategy. Ownership of BI varied across the organizations included in this study – three of the interviewees felt that there was no clear owner of BI, in one organization it was owned by the business and in five, by IT. The three organizations in which there was no clear owner were also organizations that do not have a formally defined BI strategy.

Interviewee I4 represented one of the organizations where BI was owned by IT but she believed BI should be owned by IT and that there was merit to having a centralized BI function such as an Enterprise Data Warehouse (EDW) as it promotes consistency across information published and can limit duplication of effort. For an organization with multiple, decentralized trading divisions, a centralized BI structure was the most practical solution said I7. According to I5 and I9, having BI reporting to the CIO was the correct approach. I5 stated:

*“I mean in the end it is actually an information officer and BI is information. How meaningful information is, is the big question and that’s where I think a lot of people have failed and companies have failed. We had BI outside of IS and the problem is if you don’t have close co-*

*operation in communication between your IT systems and your BI group, you have a disconnect in terms of delivery. "*

I8's organization had a central BI team based within the IT structure but was putting BI champions in place in the business teams to act as BI owners for the area. The need for close co-operation between those responsible for delivering BI and the consumers of the information provided was acknowledged by several interviewees, including I6:

*"A key learning for us would be that we need to actively allow the business to not only initiate an idea, but also sponsor an idea and sponsor a request through the insight process ensuring they are involved through the entire production of models or metrics so that a) they understand it and b) they can have input and determine the models effectiveness to their use."*

For I9, it was a case of business being the "driver" of BI:

*"It starts off by business asking the right question. If you really want to optimize value of BI, you need to educate the business – sensitize them, expose them, help them to ask the right kind of questions."*

A factor that contributes to the perception of the BI effort is the maturity level of the organization on a model such as the Information Evolution Model (Davis et al., 2006). I1 stated that *"if you've got a primitive, low level of maturity that consumes basic artifacts, their perception of value is fundamentally different to someone who consumes sophisticated artifacts"*.

Commenting on BI project failure and success, I1 noted that one of the causes of failure of projects in his organization had been the lack of understanding of the organization's maturity level and not being aware of issues and challenges related to this that needed to be mitigated. Acknowledging that the real value from BI is only realized from stage four onwards, I1 explained that failed projects related to *"enterprise information creation capability"* (stage three) undertaken against a backdrop of an organization *"struggling to get out of stage two"*.

I5 has given consideration to the suitability of the technology and functionality his organization was focused on at that point in time relative to the organization's maturity. Whilst he acknowledged that proactive BI, using real-time information, might be a goal for the future, the organization was not ready for it at that point. I5 believed the maturity of senior management also had a strong influence:

*"Well I think that the point of departure has to be that your senior executive team needs to acknowledge that BI plays a critical role in the success of the organization and in their ability to make better decisions which will eventually result in improved performance of the*

*organization. And it's only when that happens that you're actually going to find that things are going to change in the organization. So, once again, it comes down to maturity of those running the company, the maturity of your organization, because I certainly believe that the technology has reached the point where the capability is there, but once again it's within the people."*

Funding for investment in BI was typically included in an annual budget. Funding may have come from an IT or business budget (I7) and may have related to investment in BI infrastructure or the delivery of a specific solution. I1's organization, however, did not treat BI as an investment but as an expense:

*"We don't invest. In my company, we don't see any spend in the BI space as an investment. Everything that I've ever seen seems to recognize it purely as a cost and as a cost, people want to minimize that spend."*

### **Theme 3: Means / Value Initiation**

The value initiation process or "Means" construct in Figure 8 represents data, managerial and technical knowledge, relationships with vendors, internal relationships, BI processes, BI services, BI applications and the BI infrastructure. On their own, the BI assets have no value but they represent potential value which may or may not convert to actual value, depending on how they are used (Lonnqvist & Pirttimaki, 2006).

The interviewees considered a variety of components to constitute their BI asset base. I3 described the BI asset base succinctly as *"people, systems and processes"*. The most commonly cited components were people, data and the environment/infrastructure (including software). There was consensus that the BI outputs (such as reports) were not assets themselves but that the "intellectual property (IP)" (I9) or "production methods" (I1) that go into producing a report should be seen as an asset.

People and the knowledge they have were mentioned by most interviewees. I8 described the contribution made by the skilled individuals in the BI team as follows:

*"I certainly think one of the big things is our IP – I think there's a huge amount of IP. I think there are individuals, who really understand BI very well – understand its capability and understand how we can better leverage it to provide the business with a competitive advantage. I think that's the one big asset we've got which obviously is formed with people which is a big asset. "*

Data was considered an asset by most interviewees – I5 described the data asset as *“The information that you have access to or the information that you use to improve your organization”*, while I6’s description inferred the additional need for data quality and security: *“So thus, to hold the data in a clean, sacrosanct, backed up, locked library is hugely valuable”*. This view was echoed by I7:

*“The data itself - the data is definitely an asset and the fact that we have it in a cleansed format in a single repository and the fact that we have substantial history so that you can trend”*

I1 stated *“Of all the problems in BI, the data problem is the largest problem to overcome”*. All of the interviewees acknowledged the importance of data quality (DQ) in a BI environment. I1 suggested that manual processes were often a symptom of poor DQ and were implemented where systems are unable to process the data available. Ownership of the data needed to reside outside the IT and BI teams – ideally with the business area responsible for capturing the data (I1; I5). I6 and I7’s organizations were in the process of developing DQ processes and I4’s organization had clearly defined DQ processes and a team dedicated to resolving issues that arose. I2’s organization had identified a need for a DQ solution but had been unable to compile a business case to justify the cost.

The interviewees had different ways of describing the process aspect of their BI asset base. I1 explained that the significant investment in understanding where data is and how to make sense of it made ETL routines a valuable asset. Similarly, I9 stated: *“A lot of effort, money and resources have gone into the production in that report. It represents a piece of IP and that means something”*.

Whilst the interviewees were clear on what constituted the asset base, there was less clarity on the value of that asset and how the value could or should be measured. I1 explained that his organization did not place a value on the asset as in order to assign a value, one needs to be able to express it as a number and the organization was not able to. I5, I7 and I8 agreed that it was difficult to assign a value and sometimes it might be easier to assign a value to the impact of not having a BI capability.

In I7 and I9’s organizations, the value of the BI asset was acknowledged, but only by certain individuals. In other cases, only certain components of the asset base were acknowledged as assets (e.g. data). I4 was of the opinion that as the number of people in an organization receiving unique information from BI efforts increases, so would the appreciation of the value of BI assets.

The interviewees were all satisfied with the BI tools that their organizations are using. The toolsets varied across the organizations involved in this research. I4, I5 and I6 believe that the

whilst the BI tools which have been implemented are performing well, the vendors that sold the products overpromised on the products' ability to deliver business value and the products have not lived up to those promises. I1 stated: *"The problem is that the vendors tend to over promise. They tend to, at sale stage, understate what the real problems are and over state what their technology can do."*

The core skill provided by the vendor should be the configuration of the software but the organization itself needs to understand the complexities of delivering value. According to I1,

*"The business on often distances itself from the real challenges in the sense that it doesn't fully understand that producing a really top-notch, accurate detailed report is quite a big exercise. They kind of off-load a lot of their responsibility into the technology space "*

Similarly, for most interactions, vendor support was focused on product support rather than value realization but three interviewees stated that vendors provided support and input on both aspects. Most interviewees agreed that value realization was the responsibility of the organization itself as it required *"business knowledge and good understanding of how the business works"* (I2) and when it came to addressing value realization, *"The best people are going to be your own internal people that have an understanding of your environment"* (I5). Building closer relationships with vendors who are keen to understand the business environment was key for the organizations where vendor support had included assisting in value realization. I9 explained:

*"And I think, yes, the focus being pretty much on products, but also on: Why do we need this? How are we going to use it? And how's the business going to benefit from it? I think there's been quite a good focus on their side on it, so I won't say they only concentrate on the product. They've tried to also make the business value perspective clearer. Quantifying it, based on one or two business cases that we've done, they – from their experience – gave us an indication of type of benefits that one can get from these investments."*

In summary, the main components making up the BI asset base were people, IP, data and the BI environment/infrastructure. The purchase or acquisition of these assets alone will not deliver any value to an organization – the value is dependent on how the assets are used.

#### **Theme 4: The Value of BI**

Using Bannister and Remenyi 's (2000) definition of IT value in the context of BI, BI value can be described as BI's ability to enhance business performance of the organization. When asked how BI adds value to the organization, I8 replied *"The value is you can't run your business without it. Simple*

as that". Other interviewees suggested that true BI value comes from the activities described in the Analytics portion of the Davenport and Harris (2007) maturity model in Figure 2. I3 saw the BI team as an internal research unit which mined data, identified trends and suggested future actions. I6 was using BI to "uncover" value within the organization:

*"We've been running modeling projects; we're starting to run analytical modeling projects, which actually then are able to produce real business value. I think explicit value and the measure of explicit value will arrive as we start building these IP or data intensive models. I think models will show and find efficiencies in the operational process and the cost structures, but I also think they will create new models which will be tested and out of that adaptive learning process we will understand how to uncover value in the organization"*

I5 acknowledged that the value of BI lies in "future orientated" information and knowledge. Similarly, other interviewees supported Ranyan's (2008) view that BI delivers value through the proactive use of information. If information and access to information were the BI assets, then BI value came from how those assets were used to improve the organization. For I5, there were three key areas for organizational improvement: competitiveness, profitability and shareholder value, and BI had a role to play in each. I9 saw the value that BI should be adding coming through providing information to support decisions that would change the way the organization works.

However, BI activities relating to the "Access and Reporting" area of Figure 2 also contributed to the value an organization derives from BI. According to I5:

*"You've got to get down to your aggregators, to your cubes, to your accelerators and then pushing it down the line. And that way I think what's happened there is as soon as people start seeing, 'Okay hold up, I'm getting this. This is allowing me to see whether my division is performing properly, what my level of contribution is, how it's impacting on my profitability'. "*

Using BI to monitor and measure operational processes as suggested by Elbashir et al. (2008) was supported. For example, for I7, value came from being able to measure operational performance:

*"I think from just a process management measurement point of view, it definitely adds benefit. The fact that we have visibility on how well we are managing our processes, how well are we managing our suppliers – the fact that we can measure that is very important and that is where the return on BI investment comes from because you are either going to save money or generate more turnover because you are managing your processes better or more efficiently"*

Competitive advantage is often dependent on the use of time-critical information (Ranjan, 2008). A decrease in the delivery time of actionable information is another way that BI could add value to an organization. I7 stated:



*"BI adds value to the business because it enables the business to get access or allows the business to have access to information, operational information which is then analyzed and turned into strategic benefit quicker than what it would normally take them to delve into a whole bunch of operational separate systems or paperwork to try and come up with the proof or the fact or the data they need to make a decisions"*

This view was shared by I5:

*"Information only has value when it's generated – it needs to be consumed when it's generated because after that somebody else would have already consumed that information, reacted and would be ahead of you if they are your competitors. Until we get into that mindset and that space, you're not really going to be able to put a true business value on BI type information"*

Lonnqvist & Pirttimäki's (2006) view that BI has no inherent value was supported by I3 who described this as a difference between the potential value that BI held and the actual value derived when the BI information was acted upon. This view was shared by I2:

*"So the first part is to say is it possible and then for people to understand what we will do about it. For some of the past models, we just focused on the management part. So we say what is the value of this but we're lacking a bit on the execution side. I think everyone could derive the benefits, the crucial part is working on the execution itself. To have the insight is not enough, you need to have an action, and consistency in your actions. And people should be held accountable for their decisions – that's the part that closes the loop."*

The challenge of expressing BI's value to an organization as a monetary value was noted by a number of interviewees. I9 stated simply that *"the monetary value is difficult"*, a view shared by I7: *"[The return] doesn't have to be quantitative, it can be qualitative but it is difficult to measure on some projects, definitely. Not everything is quantifiable"*. I5 was of the opinion that the ability of an organization to effectively quantify the value of BI was a factor of the maturity of BI in the organization, and for him, at that stage, the value tended to be qualitative. Both views were supported by I1:

*"We might have been able to justify it if we were better able to articulate the soft value of business intelligence ... The culture of this company is financial, obviously. Money. Very cost-centric, almost an administrative mind set, whereas if you approach BI from an entrepreneurial mindset then you can see the full picture, you can see the full value proposition in terms of what it is you're trying to do....We have to master the ability to articulate qualitative value... If you adopt a mechanistic, administrative view of the world where cost is the god that you bow to, then insight is a very soft notion."*



I1, I2 and I6 mentioned that their organizations use business case documents to propose BI projects. Whilst a clear business case document was needed for BI project approval in I9's organization, the overall development of the data warehouse was done without one. Similarly, large BI projects for which there was no formal business case were underway at I4's organization.

Groh's (2004) view that the complexities of attaching a value to qualitative benefits makes building a business case for a BI initiative more challenging than for other types of IT investment was shared by I1. I1 believed that if business case documents catered better for the "soft" value returns that BI delivered, organizations would be better at expressing and measuring that value:

*"If you equip business cases with the ability to express soft benefits better, by linking it to your incentive and rewards schemes in the organization.' I've given you this money to invest an information artifact and I expect you to show me value'. I think then people would put more effort into finding ways in articulating it, that value in both hard and soft terms and possibly, more importantly, by legitimizing soft value."*

Interviewees also suggested that when trying to calculate the value BI adds to an organization, one should also consider the value that would be lost if the organization did not have a BI capability. I4 stated, "Another question to ask is, what would you have been prepared to pay to prevent something going wrong?", a view supported by I7 - "I think that the value of what we have in place right now is equivalent to the cost of them not having it". I5 noted that acknowledgement of the value of not having BI is dependent on the adoption and usage of BI:

*"So you won't get to that yet (measurement in monetary terms), until you have a level of maturity in the organization, you've got a high level of adoption and usage and then potentially, you have a failure which will suddenly wake people up to the actual monetary value of not having that information".*

Whilst there were views on specific indicators that illustrate the value BI brings to the organizations, the opinion of some of the interviewees in Crossland's (2007) research that as long as BI was being used, it was adding value was supported. According to I6, "We aren't really able to quantify it, but there is a good implicit understanding of the value of the area", and I8 stated "We intrinsically know that it adds value, you can't do your job without it, but as we said earlier, have we put a rand value to it? No". I9's view was that the support shown for BI by the organization was an indicator that it added value:

*"The other proxy would be that I submit the budget and I've X million rand provided for BI and the organization says, yes, that's fine, go ahead. Which intuitively, they're saying they're prepared to pay so much for the assets that we've got and they believe they will actually get more value for that."*

Lonnqvist & Pirrtimäki's (2006) view that value is subjective was shared by I9: *"Value is not a tangible thing; it's a very subjective thing. Value...in the end it's all about satisfying the need"*. I4 suggested that BI value was based on perception and personal experience of value:

*"I would say, at the bottom line there is perception management. If you can be very pro-active in how executives perceive the warehouse and the possible value from that and so forth, then I think you're on top of the game.... It's often a simple little example that will make the executives happy and all your scientific ways of trying to show the value they laugh off, but if they could one day give a quick answer to someone who asked x, then they'll say, 'yes, yes, yes, this is a valuable thing, we must carry on'. Basically, one little personal experience of some value and they would change their minds."*

Perception of BI value was dependent on communication - *"it is also in how you communicate and make that saving or additional turnover publicly known or publicize it to other forums"* (I7)

The ways in which BI was adding value varied from support for strategic decisions and complex analytics to operational reporting. Whilst all the interviewees acknowledged that BI was adding value to their organizations, how that value is assessed appeared to be a complex issue.

### **Theme 5: Measurement of the Value of BI**

The need for BI was expressed by I3 as *"a function that's so critical but yet so undervalued"*.

However, none of the interviewees felt that their organizations were able to measure the value of BI in a way that reflected the qualitative aspects of BI value. This finding would not come as a surprise to I5 who stated:

*"I'm not sure there are going to be many organizations – I would expect less than 10% - that are going to say we actually measure the value that we are getting out of our information, whether that is structured or unstructured information. In most cases they'll probably say they're only looking at the value of structured information that has been generated by their transactional systems... Given that you don't even have the value of IT, how can you expect to have the value of BI?"*

For I8, the measurement of the business value of BI was *"intuitive"* and, at that time, a Rand value could not be placed on it as value was based on *"gut feel"*. I5 stated *"It's not measured. It's not quantified"*. I3 was not aware of measurement of BI in his organization, and suggested that if there was measurement, it was not a formal process.

Different approaches to measurement were used in the organizations that participated in this study. In I1's organization, the most comprehensive measurement took place in the leads generation area – but the focus tended to be on the prediction of expected results rather than the measurement of actual results and even that was flawed. I2's organization was measuring campaign responses and in some cases, this could be translated into business benefit. I9 had used an approach of looking at the reports generated, who used them and for what purpose to conclude that the value generated by BI in its current state within the organization did not justify the cost associated with it. In I2's organization, decisions had been made to stop BI projects based on cost/benefit predictions for those projects. In I7's retail organization, the value attributable to BI applications in the supply chain area were actively measured and monitored.

Gibson and Arnott (2005) suggest that the evaluation of BI needs to include consideration of the opportunities the technology presents to the organization, a view shared by many of the interviewees in this study. I1 questioned the value of accounting approaches for the measurement of the value of BI:

*“Is there value to metaphorically knowing that the competition is doing something or that there is an opportunity? Of course there is value but again, how do you measure it? How do you describe it in way that excites accountants? And that's the problem – I don't know either”.*

I9 stated that *“One of the things that stands out more, definitely with BI, is the benefits are very often intangible, indirect and delayed. And that makes it even more difficult...Those are the things that make BI value a difficult question, but it's something that people are looking to, to add value”*.

I2 described the challenge of measuring the indirect, intangible and delayed benefits associated with BI as *“the million dollar question”*. The interviewees all agreed that the intangible benefits of BI are difficult to measure. For I8, factors such as the input requirements, the BI output and even the attitude and experience of the user of a BI report all influenced the benefit that could be derived but what the benefit is attributed to would vary from one person to another: *“Depending on the angle you're coming from you can say everything's due to BI but other protagonists would say ‘BI, what's the big deal?’”*. Similarly, I5 was of the opinion that the measurement of BI value would only happen once companies came to rely on the information generated by BI teams and started to question what the impact of not having that information would be.

Examples of BI initiatives that had been undertaken but for which it had not been possible to measure the benefit that has been realized as a result, included a model to measure the value of differentiated service offerings (I2) and marketing campaign effectiveness (I4). Indirect benefits that arose from BI implementations included increased capacity for activities that added value as time-

consuming manual data collation and reporting activities were replaced (I6) and in cases like these, measurement was complex because it was difficult to show the causal link (I4). Delayed benefits often arose from projects that aimed to improve behavior or processes (I7).

The interviewees provided a number of suggestions as to how the measurement of BI value could be improved. I9 planned to appoint a person to track the business benefits of IT and BI projects. I7 and I9 noted that the benefit needed to be measured over whatever payback period was proposed in the business case. Elbashir et al. (2008) suggest that different types of IT warrant different measurement approaches that must take qualitative benefits and performance measures into account. I1 supported this view: *"We have to master the ability to articulate qualitative value... We've got to find a different language to represent value"*. A similar opinion was expressed by I3 who stressed the need for the measurement of the action resulting from BI information, not just measurement of the BI process:

*"It's not just one kind of point of engagement saying, 'this is what we've found'. It's also, do they use it or not? That's the other part of it because then that's also part of the measurable. So it's the value add potential, but then did they actually implement that or not, that's the second question. Because they then can, internally, decide 'No, that's a load of rubbish'"*

Client surveys were used in the organizations represented by I2, I4 and I9. I2's clients of the BI team were surveyed regularly for input about the importance of the work done by the BI team and the quality and value of the information delivered to them. I4 had used a *"user experience expert"* to observe the processes business users had adopted to obtain information and provide feedback to the BI team which was used to address issues that had arisen. I9's *"business confidence survey"* was an IT initiative that looked at the availability, accessibility and consistency of information within the organization which was to be extended to include the BI area.

Ultimately, the ability to measure the value of BI should translate into quantifiable benefit, even if the benefits are indirectly attributable to BI. I9 stated:

*"I want, in the end, to see in the business budget that either they've got additional revenue or that the two million as a cost can be taken out. Then I know that the benefit has been realized. We're not recognizing that as a benefit. You need to reflect where it matters."*

In contrast, I8 was not convinced that the effort needed to overcome complexity associated with the measurement of BI value was warranted. In agreement with Whittemore (2009), I1 was skeptical that it is always possible to *"attribute an outcome to an information artifact"*, a view shared by I2:

*“If I have 1200 users and I give them a daily report on leads actioned, how do you determine to what extent that report improved the actioning of the leads? There are so many other factors that come into it.”*

None of the interviewees felt the value of their BI assets had been measured accurately. Most agreed that it would be desirable to be able to do this, but they argued that it would be complex due to the intangible nature of assets such as knowledge. Whilst I4 and I5 mentioned that purchased assets were treated as any other for accounting purposes, I9 dismissed the notion of using accounting measures and processes such as depreciation to assign a value to the BI asset base – *“That’s an accounting practice. For me, it’s no real indication of value”*.

None of the interviewees were using balanced scorecard type measurement tools similar to the one proposed by Lonnqvist and Pirttimäki,(2006), nor was there any evidence of a formal Benefits Management process (such as the one proposed by Ward and Daniel (2006)) being used to measure the benefits associated with BI initiatives in any of the organizations included in this study.

To gain a better understanding of how the potential value of the BI assets becomes is transformed into the actual value the interviewees described in Theme 4 (The Value of BI), the manner in which the assets are used needs to be examined.

### **Theme 6: Ways / Value Conversion**

The BI assets were used for a wide variety of purposes in the organizations that took part in this research. I8 described the use of BI outputs as *“pervasive”*. The financial services and insurance companies included in this study were using BI for management reporting, reporting (operational process and risk management), new business applications (loyalty, customer service, profiling), marketing (campaign measurement). The interviewee from the telecommunications company reported that that organization was using BI to gain insight into customer behavior, to develop and manage products, to segment their customer base, to identify sales opportunities, financial reporting and to manage regional operations. In the petro-chemical organization that participated in this study, BI was being used to measure performance against budgets as well as process based metrics across all areas of the business. The retail companies included in the study used BI for customer research, competitor analysis, managing processes such as supply chain, producing dashboards, adhoc reporting, static reporting and data extraction for third parties. BI provided the media organization with tools to identify sales opportunities and devise campaigns, provide a better understand advertising revenues and distribution and to manage corporate performance. In I2’s

insurance organization, BI also played a role in the preparation of business case documents for projects being proposed in other business units as they provided data needed for the benefit statement section.

A BI Competency Center (BICC) is a “cross-functional team with specific tasks, roles, responsibilities and processes for supporting and promoting the effective use of BI across the organization” (Miller, et al., 2006, p2). Five of the interviewees had established BICCs and I6 was in the process of establishing one. For I7, the biggest benefit of establishing a BICC had been increased visibility of the importance of BI in broader projects and the participation of the BICC from project start-up. There were varying opinions as to what constituted a BICC with I2 observing *“I see that everybody has their own idea of what a BI competency centre is. I find it almost a misused word at this stage.”* I5 had opted to refer to the area as a *“centre of excellence”* as he believed it highlighted the interdependencies of the various areas involved in delivering BI.

I8’s organization had a “BI Delivery CC” but noted that this area was responsible for the technical aspects of BI, and the “Business Champions” were not part of that team but remained part of the business team. Although I1’s organization had a BICC, the value of it in its current form was questioned by I1:

*“I think our competency center is not a real competency centre in the classic definition. I think it’s just a place where there’s technical expertise around a particular product set. For me a competency centre is a multi disciplinary thing and I really don’t think we’ve got that down to the business level”.*

I1 noted that the following challenge associated with establishing a BICC:

*“The one thing that the BICC does fly in the face of is the dynamic of information being power. The moment you hand over your capacity to produce information to somebody else, it makes you dependent, it makes you vulnerable, it exposes your capacity to ice over the cracks in the icing and make things look the way you want them to look rather than potentially the way they really are. It’s a counter-intuitive solution to the way people behave.”*

I4’s organization was one of the organizations that did not have an established BICC and this could be linked back to the fact that there is not a clear ownership for BI within the organization:

*And in [this organization], this informal kind of BICC, I don’t have a lot of hope for it because there’s so much pressure in [this organization]— time pressure, performance pressure, target pressure – if that’s not your function, if it’s not your main function to deliver information to [the organization], if it’s always on the side...it will never be your priority. Unless there’s a higher level being reported to – you are the managing executive of information for [this organization] and you must make it work for [this organization] - if that’s not the case, it will never work. It will always stay this disparate thing”.*

The organization had opted to view BI as a service and had appointed a person responsible for the delivery of this service to each business area.

Self-help options were encouraged and seen as a goal for many interviewees, but they also acknowledged the need for sufficient training to ensure a certain level of competence in the users these solutions are targeted at. According to I6,

*"[Self-help solutions are] most definitely encouraged. I'm not certain that we're very good at that just yet; I think end users have been a little resistant to self help and I think that's largely a confidence issue. I don't think it's an accessibility issue and I don't think it's a complexity issue. I think it's really a confidence issue, I think it's about change in management and it's about assisting people."*

On the topic of self help solutions I1 and I9 both expressed concern about another interpretation of "self-help" BI solutions, i.e. those which were created from the data level upwards in business areas with little thought to data quality, data integrity, definitions or change control and resulted in different figures being quoted by different business teams for the same metric.

*"I'm trying not to sound too cynical about the end users. They help themselves through Excel and develop massive excel spreadsheets using their own data with no regard to ETLs etc. And look, it's also perhaps their only recourse, but it's a practice that has actually developed over years." (I9)*

The greatest benefit of self-help tools is that they can speed up the time it takes for an end user to get the information required by enabling a user to create their own reports and extracts without going through and IT or BI intermediary. This in turn allows the BI team to focus on delivery of BI activities that add more business value (Eckerson, 2010). I5 believed that BI needs to shift from pushing information to users to providing users with the tools and training they require in order to be able to pull the information they need from central repositories:

*"We're moving away from this big back office where we go and configure everything and one size fits all, to we give you the option of saying, 'here's the front-end, you decide how you prefer seeing the front-end and you set it up'."*

One of the risks of creating BI artifacts with a 'push' approach is the risk of the report, cube or extract not being used (Whittemore, 2009). Three of the interviewees mentioned that they have tools in place to monitor report usage and there are reports that are not used. When I2 detected that there are reports that were not being used, the organization tried to use training to address this rather than dismissing it as a user problem. I4 has initiated a "user experience investigation" in an attempt to identify why reports were not used.



Whilst the interviewees had slightly differing views on what constitutes a BICC, there was strong support for the concept of a centralized BI capability that supported all aspects of BI. Self-help tools were seen as a goal for most of the organizations, however, there was acknowledgement that the BI environment in their organization was not yet mature enough to implement these solutions. The Soh and Markus (1995) model (Figure 4) refers to the “Ways” component as the “IT use process” and the appropriate or inappropriate use of assets in this process will have a bearing on the outcome of initiatives aimed at realizing the value in those assets.

### Theme 7: Ends / Value Realization

The interviewees were able to provide examples of successful and unsuccessful BI initiatives that have taken place within their organizations. Projects undertaken included the delivery of information and BI artifacts to business users as well as the implementation of enhancements to the BI infrastructure.

I5’s petro-chemical organization had had success in areas where senior executives had understood the value of dashboards and had supported the BI projects and where the metrics used had not been overcomplicated. In the retail sector, I8’s most notable success was the ‘overhaul’ of the entire BI environment with the implementation of a new data warehouse and a new suite of BI tools. The new environment had enabled the widespread implementation of OLAP cube functionality allowing users access to self-help tools. For I7’s organization, a supply chain project had resulted in process improvements as inefficiencies were highlighted and once the solution was fully implemented, supplier conformance would result in increased turnover and cost savings. In I3’s organization, BI had been used to identify opportunities for expansion into new markets as well as to influence corporate strategy through in-depth analysis of competitor activity.

The financial services organization represented by I6 had successfully implemented a BI environment and populated its data warehouse which enabled the building of analytic models to predict response rates. I1’s insurance company had had success with smaller, focused projects rather than enterprise level initiatives. I1 believed this kind of project tended to be more successful because *“the focus is much smaller, there’s a much smaller group of stakeholders that can influence the political dynamics of the initiative”*.

In the telecoms industry, I4’s organization had used BI information to improve regional operational processes and to identify products and services best suited to the different regions. I9’s media



organization had used BI tools to analyze advertising data and to identify opportunities for increasing advertising revenue.

For I7, the reason their organization had a good track record for successful BI implementation was the structured planning process in place for the entire IT area, including BI:

*“I can’t really think of any projects that we did that were unsuccessful or an implementation that’s not being used but that you can attribute to the ICT planning process so we don’t embark on BI projects if we don’t think there is going to be some kind of return on them or that there is a need in the business for that information because you can create a fantastic BI solution but if the business doesn’t use it or believes they don’t need it, it’s not going to be successful.”*

Many of the interviewees were also able to provide examples of unsuccessful BI initiatives and offer some insight as to why they thought their projects had been unsuccessful. I1’s organization’s unsuccessful projects tended to relate to *“trying to promote an enterprise synergistic information creation capability”*. The challenge with this type of project was the number of people with vested interests in the project and how to get their commitment to the project and consensus on issues that arose. I1 believed the solution to this problem is to do a maturity assessment similar to the one suggested by Davis et al. (2006) in order to understand what structures needed to be put in place and issues addressed before such a project commenced.

I4 attributed the failure of one of their BI projects to the fact that the decision to implement a product was made without the involvement of all stakeholders. The system was implemented but fell into disuse as it was unable to provide all the information that the business required. There was also a need for stakeholders to have an understanding of the BI process, what their involvement is and when input will be required from them. Another cause of project failure had been the time taken to deliver a perfect solution. I4 explained:

*“So they spent so many times reloading, rechecking that by the time they eventually delivered, it was too late. So I’m a very big advisor of if you want to do warehousing and BI, you better deliver some value in six months the first time, and thereafter every three months. You mustn’t take years building a warehouse with all the information...start small, deliver some and build on it, build on it, build on it – And whatever you deliver make sure it’s correct and adds value. “*

Reliance on key resources has also been a cause of project failure. I2’s organization implemented a data mining solution which fell into disuse after key team members left the organization. An early version of their customer warehouse was not entirely successful as it was built by external resources

who had focused on implementation and had not provided ongoing maintenance and support procedures.

Projects in I5's organization had failed due to misinterpretation, misunderstanding of user requirements and a lack of communication. Similarly, I6 mentioned an analytical model that was not implemented due to changing business requirements that were not communicated to the BI team.

Another cause of failure in I5's organization had been a lack of comfort with and adoption of the technology:

*"The other thing where you have failure is where the organization is entrenched in using spreadsheet analytics instead of core data to go and present their specific reports or dashboards. A lot of people have written pseudo dashboards in Excel and they take data from wherever and they populate it and they produce this lovely looking thing that always has all these green bars on and very few amber and red bars and when you look in the system, half of them are red."*

The BI activities of competitors were of little concern to most interviewees – *"We're not really worried too much about what our competitors are doing in their BI space"* (I7). However, there was an increase in how BI is being used to analyze the operational and strategic activities of external organizations:

*"Like any organization in a very competitive environment and especially with conditions like this, so every bit of insight that you can get to do better than your competitors, you need to get."*

*There's a fair amount of competitor intelligence – we call it marketing intelligence and we've just kicked off a project where we're also centralizing that. Increasingly I'll blend that with the more formal BI. "*

The interviewees were able to provide examples of successful and unsuccessful BI initiatives that had been undertaken within their organizations. In most cases where examples of unsuccessful projects were given, the interviewees were able to identify reasons as to why the initiative had failed.

## **Theme 8: BI Challenges and Success Factors**

All of the interviewees could see opportunities to increase the value that their organization derived from its BI program. Involving more people in the BI process was a key factor for many interviewees. I2 stated simply: *"We need to grow the BI capability by involving more and more people using the data"*. I5 suggested that business users needed to change their behavior:

*“As soon as people change their own behavior and they start saying, ‘Okay, I need to go and pull the information, I’m going to go in there and I’m going to see what my current performance is. Let me drill down. Is it in this specific area? Who’s responsible for that? Let me go talk to them to say please do something’. Until you start managing that way, you’re not going to get to the point where you’re able to say that this information has a financial impact, or, the risk of not having this information is translated to financial terms.”*

This view was echoed by I9 who stressed the need for users to be able to ask the right questions of BI. Part of including more people in the BI process was increased involvement from senior managers - described as “*top level buy-in*” by I4 and supported by I5:

*“Well I think that the point of departure has to be that your senior executive team needs to acknowledge that BI plays a critical role in the success of the organization and in their ability to make better decisions which will eventually result in improved performance of the organization”*

I5 and I6 shared the view that there was a need for “*BI Evangelism*”. For I5, this would be “*a little bit of a visionary sitting out there that’s prepared to take just a little step ahead of everyone else in terms of what needs to be done*”. In I6’s view, there was a need for the BI team to show the business areas how BI could add value to them:

*“I think it’s really a confidence issue, I think it’s about change in management and it’s about assisting people. So I think it’s getting out there, championing it, evangelizing the solution, showing people how they can use it. I think there is an element of the organization really not knowing what it doesn’t know. So I think BI needs to get out into the organization and instill the solution or otherwise the organization needs to develop that appetite, that confidence, in driving queries and questions to BI.”*

This view was supported by I4 but tempered with a warning about pushing information to users when they had not requested it:

*“If you must wait for the end user to say what exactly they want to see on the new product, you’ll wait for months. So, for my boss, it’s easier to say, okay two weeks after launch date, we have pushed out a report whether we know exactly what they need or not. And that’s part of why we wasted money and time in the past – so at least he could say the report was there.”*

I2 suggested the identification of “*power users*”, whose role was to have an expert-level understanding of a segment of the business and the data used to support that area. For I6, increased value would be realized if the organization became more familiar with the BI tools and information that are currently available. I4 saw the distinction between the various “*personas*” involved in information delivery as critical. To this end, an exercise had been undertaken to identify the different roles involved in information delivery (such as information creators, information

brokers and information consumers) and to ensure that the tools and processes available to each of them were appropriate.

Resources who understood both BI and the business were critical to the success of BI. For I4 and I5, this could be viewed as a type of business analyst:

*“How do you want to take this massive amount of information, how do you represent it to our people? Those people are really the business analysts within the organization so that at least you’re saying well; they do have an understanding of the industry, of the company, of our processes, of what really has value. They’re the ones who are determining how we take this stuff and populate it so that the managers have access to information that might assist them to make better decisions.*

*So the role that your business analyst has to play, where you’ve got that keen understanding of the requirements of the organization, of the functionality and capability of technology, marry the two together and then make sure that the guys that are delivering the actual configuration are doing it correctly.” (I5)*

I8 described this role as a BI champion:

*“A BI champion, okay. And that individual really will drive the requirements from a business unit perspective into BI. But ultimately when it comes to the crux, that BI champion is going to work very closely with IT but needs to be the champion of that business area because someone in IT not going to dream up what they need. One of the other things that we have is we have a business analysis component sitting in BI and you can argue that true business analysis is just enablement of what the business has already analyzed in terms of what they want, but our view, certainly in going forward, is that we push those business analysts back into the business units.”*

I8 supported Davenport and Harris’ (2007) view that the focus of BI needs to move towards more strategic decision support and suggested that financial analysis and an automated, company-wide performance management scorecard were areas that BI should be looking to address. Similarly, I1 supports the view of Davis et al. (2006) that the higher the information maturity level of the organization, the greater the business value realized from investment in BI will be: *“Optimize and innovate – in the model, innovate is the final level of maturity but that’s also where the value lies. You’ve got to be innovative, you’ve got to be creative about how you use information”*.

Turnaround-time and understanding the needs of the business were critical to value realization for I4. According to I7, *“The business is very ready for BI, its information hungry and if we could deliver faster, we’d definitely add more value”*. Daniel (2007) supports this view and recommends building and delivering proof-of-concept deliverables as quickly as possible. Self-help tools could provide opportunities for getting information to business users faster. I5

believed that the time to deliver information to consumers of BI needs to decrease if BI's value was to be fully realized:

*"Of course I think the other thing is as with anything, information is a consumable – when once it's out in the public domain, it becomes historic, so if you don't have access to that information as and when it's available, you lose your competitive advantage. Now if you think about that in terms of real time analytics or real time information feeds, the complexity is high. So obviously we're not there, but that is what I believe, and where I believe, the world of BI and organizations will be in the not too distant future. You have to say that to remain ahead of your competitors; you need access to that information almost in real time mode"*

In addition to improved delivery times, data quality needed to be addressed as there was a need for "credible data, trustworthy data" (I9). I4 stated that users needed to be able to trust the data and that it was important that they perceived the warehouse as valuable. To this end, communication experts had been used to assist BI in marketing the value of the warehouse to the business.

For I1, the "production cycle" of information needed to be improved. There were opportunities for improved synergies between various BI teams within the organizations – for example, reducing the number of different BI tools in use in the organization would result in significant cost savings. I9 believed that BI needed to increase the number of channels used to deliver information to consumers but that the information must be consistent across all channels. There were also opportunities for streamlining processes and products at I4's organization:

*"But at the moment we are spending lots of money in different ways that's not streamlined and focused on really improving the whole BI service so it's kind of putting plasters and so forth. So if we could just collate all those efforts and money into a single thing, someone with a vision and that can design the architecture that can really meet all the needs - that would be a lot more effective."*

A reduction in the complexity of the process of obtaining information was needed. I8 stated that complexity was exacerbated by the volumes of data that existed within the organization and BI deliverables needed to highlight exceptions rather than just reporting on day-to-day activity. Similarly, in I1's view:

*"Execs spend 30% of their time trying to find the correct information, another 30% trying to understand what the hell it means, leaving just 40% of their time to make decisions. He wants to use the information and increase that to 90% and reduce the others to 10%. And that's true – we don't count the cost of wasted human effort just to make sense of what it is"*

For I2, value would increase if the lessons learned in one area were applied in others with similar challenges – *“I think we can bring down the cost by applying what we know in other areas like the call centre”*. I1 proposed developing an “information laboratory” that would use a prototyping approach to developing BI for business teams:

*“I come away and I have created a product, I have tested it in the market and I know I have an understanding as to the receptiveness of that market – sure the guys with the stats will query the sample size, but I can conclude as to the value of that product. There’s a chap at [a South African retail banking group] who does that kind of stuff for his company and he is doing exceptionally well in the sense that he makes these information artifacts. He’s very creative, he’s very in-tune with what could be of value to the business. He makes the knowledge product, he invests in its creation then he goes to the business and he says – if I gave this to you every day, every week, every month, would it help you? Fine – what’s it worth to you?”*

Apart from the challenges and possible solutions mentioned, I4 believed that perception management is key to ensuring BI efforts are supported within the organization:

*“So I would say, at the bottom line there is perception management. If you can be very pro-active in how executives perceive the warehouse and the possible value from that and so forth, then I think you’re on top of the game. Not the integrity of the data, not the data quality, not how quickly you deliver in the mornings; but the perceptions will make or break the success of a system like this.”*

I9 believed that the value that an organization realizes from BI is dependent on a level of trust between BI and the business users:

*“If you have a working relationship where there is a good degree of trust, there is a partnering between business and BI, business experiencing BI really trying to understand them, doing what’s needed and producing solutions and results, that help them do better – the question of value would not come up. It’s implicit.”*

Although the interviewees were aware of opportunities that exist to increase the value they derive from BI, they were also aware that there are a number of challenges that need to be overcome. For I1 the biggest challenge was funding BI, particularly in a large organization. Not being able to predict, measure and express the value derived from BI made this issue even more complex as *“you’re asking someone to risk investing in something that may have absolutely no value whatsoever”* (I1).

I5 noted that BI’s successes can quickly become one of the challenges that BI then needs to be overcome. An increased demand for BI delivery from the same resources, the need to incorporate structured and unstructured data from a wider range of sources and real-time feeds were all

challenges that I5's BI team would face as it matured and became proactive, rather than reactive. I7 mentioned the need for a robust prioritization process to ensure that BI efforts are focused on the right projects as the demand for access to resources increases.

I4 noted the need for more people to be involved in the BI process, but also acknowledged that this was likely to be a challenge:

*"I was a little bit discouraged during the project phase where we really asked the people to do our prototype testing for us and they just don't care. If it's not really going to make a difference in their lives, they push it down their priority list....it's very difficult for them. So I think that will still be a challenge. To really get people involved in producing information, I don't think they see it as part of their business, their work. They just assume the information must be there to consume. They don't see themselves as being part of getting it ready for consumption"*

Whilst most of the interviewees included people and skills in their description of what constituted the BI assets in their organization, all but one of the interviewees mentioned the lack of well skilled BI resources as one of the challenges they needed to overcome. The skills "dearth" (I1) was the cause of bottlenecks in the BI process at I7's organization and at one stage, the data mining activities at I2's organization had ceased due to the departure of two key resources. I6's organization was spending more per capita on resources in the BI team than any other area of the business and I5 linked the higher costs to scarcity: *"It's very difficult to find those right people in the market, to bring them in and, of course, it tends to be rather costly because if it is a scarce skill, the guys know it's a scarce skill"*.

The interviewees were aware that there would be challenges associated with optimizing the value the investment in BI could deliver to the organization. However, they were able to provide a number of suggestions as to how these challenges could be overcome.

### Summary of Data Analysis and Findings

The organizations included in this study represent a variety of industries and are using BI to support a variety of business functions. BI was described as 'pervasive' by one of the interviewees and the specific functions and areas that BI is supporting include organizational performance, management reporting, business processes, business applications and customer acquisition and retention.

Whilst all the interviewees reported that their organizations are realizing value from the investment they have made in BI, there was little evidence as to how this value has been or could be accurately measured. There was evidence that the assessment of the business value of BI is sometimes based

on gut-feel and whilst the interviewees acknowledged that this is not ideal, there did not appear to be any structured measurement approaches in place or proposed.

The interviewees offered a number of suggestions as to how the value BI delivered to the organization can be increased and the growing BI asset base exploited. Suggestions varied from the need to involve more people (including senior management) in the BI process to improvements in the BI process that would reduce the time taken to deliver information to the business. The interviewees acknowledged the need for a BI strategy, its alignment with that of the organization and the identification of an owner for BI.

The process model used for the study (Figure 5) provided an appropriate framework and the interviewees were able to provide insight as to how BI assets are acquired and transformed into business value as a result of appropriate use. Information maturity level assessments can be categorized as part of the Means process (or the Alignment and Conversion processes suggested by Soh and Marcus (1995) and Marshall et al. (2004)). BICCs, the role of people in the realization of BI business value and improvements in the BI process would form part of the Ways process as they contribute to the appropriate use of the assets purchased, which in turn contributes to the value that is ultimately realized from the investment in BI technology that occurs in the conversion process. Value measurement is part of the Ends process (or the Soh and Marcus' (1995) Competitive process). The need for a BI strategy and ownership spans the entire value process as a BI strategy should address the goals and objectives for BI, the approach, structures and processes that will be required to deliver on those goals as well as the criteria to be used for monitoring and measuring the achievement of the goals.



## Chapter 5 – Discussion of Findings

This chapter discusses the findings that emerged from the data analysis phase of this study. The explanations offered by the interviewees as to why certain BI projects had succeeded or failed within their organizations, as well as their responses to questions about BI value and measurement, provide insight into the challenges that organizations face when implementing BI and attempting to realize business value from that investment.

The following findings will be discussed in this chapter:

- Information Maturity Levels and how they impact the outcome of BI initiatives undertaken
- BI strategy and ownership – what is the link between strategy, strategic alignment and ownership. Who is responsible for delivering value?
- What role do people play in the realization of BI value and is a BICC the answer? How should BI fit into an organizational structure?
- Why are there questions about BI value and how can the measurement of the business value of BI be improved to cater for intangible, ‘soft’ and qualitative benefits?
- Improving the BI process and time taken to deliver business value

### Information Maturity Models

The information maturity level of the organization impacts BI and needs to be understood before embarking on BI initiatives. The Information Evolution Model proposed by Davis et al (2006) is a tool that can be used to assess the information maturity of the organization in terms of infrastructure, process, people and culture. The model views maturity as an evolutionary state and organizations evolve from an ‘operational’ level (with individually controlled data stores used to address day-to-day issues) to an ‘innovation’ level where growth is driven by creativity and new ideas. There is a need for the four aspects of the model (infrastructure, process, people and culture) to be in balance, as an overemphasis on any one of them will lead to dissatisfaction with the role information plays in the organization (Davis et al., 2006).

The information maturity level of the organization and the impact of this on BI activities were mentioned by a number of the interviewees (I1, I4, I5 and I8). I1 suggested that any organization undertaking a large BI initiative should first complete an assessment of their information maturity to ensure that they are prepared and ready for such a project. Being able to assess the maturity of the organization using a model would allow an organization to understand what structures need to be put in place and issues addressed before a BI initiative is undertaken if it is to be successful. The defined levels of maturity enable an organization to define its goals in terms of information maturity and ensure that the BI strategy which it defines supports those goals. Having clearly articulated

information maturity goals will also make it easier for an organization to measure its progress and success.

The maturity level of the organization is also a factor to consider when deciding on the channels to be used and information delivery tools to implement in order to deliver BI to business users. Interviewees stated that self-help tools were an ideal solution but acknowledged that due to the maturity levels, it was unlikely that such a solution would be a success at that point in time. A clear understanding of the maturity level of the organization would ensure that appropriate solutions are implemented at the appropriate time.

### **BI Strategy and Ownership**

The definition of a BI strategy and the identification of an owner for BI ensure that there is a clear 'roadmap' for the implementation of BI and subsequent projects. Although all the interviewees acknowledged the need for a business strategy that was aligned with wider IT and business strategies, such strategies were only in place in five of the nine organizations studied. Without a sound BI strategy, an organization's resources may be misdirected and time and money will be spent resolving issues rather than building BI solutions that support BI goals and deliver value (Daniel, 2007). The statement from I1 that it would take two to three years for his organization to define an information management strategy suggests that compiling a strategy of this nature can be a complex task.

I1's view of the component parts of a BI strategy could offer BI sponsors, managers and owners a structured framework within which to build a comprehensive BI strategy that addresses data management, information management, BI business, BI technology and data warehousing and funding and the links between them. Defining smaller, more focused sub-strategies may make the task more manageable and likely to be completed.

Literature relating to BI strategy stresses the importance of having an executive level sponsor for BI (Daniel, 2007) who is responsible for ensuring that BI is supported as well as promoting BI and its potential for adding value within the organization (Venter & Tustin, 2006). In three of the organizations included in the study, there was no clear owner for BI and it stands to reason that these organizations did not have a formally defined BI strategy as it is unlikely that there was a person taking responsibility for the definition of such a strategy. A lack of ownership of BI has an impact on how BI is incorporated into the organization's structure. Without a clear strategy and owner for BI, it would be difficult to establish centralized structures to support BI such as a BICC.

BI was owned by business in only one of the organizations included in the study, whilst in the majority (five), ownership resided with IT. Although IT plays a key role in a BI project, the requirements and solutions should belong to business teams and they should be responsible for deciding how, when and for what the information is used (Griffin, 2007). Two of the interviewees from organizations where IT owned BI agreed with the view that business should be the owner but in their large organizations, with centralized BI teams, it was not a practical solution as the business areas were not centralized. In contrast, two interviewees who are CIO's of their organizations believed that the IT area was the correct place for BI as it is an *information* issue even if it is not considered primarily a *technology* issue.

### **The Role People and BICCs Play in Realizing Value from BI**

People and the IP they hold was something that all the interviewees identified as forming part of their BI asset base. Whilst Davis et al. (2006) warn that an overemphasis on the value of people in the BI process could be the cause of dissatisfaction with BI value if not balanced with knowledge processes, infrastructure and a culture that support BI, there were a number of people-related suggestions from the interviewees in response to questions about how the value realized from BI could be optimized.

There is a clear need for people in a role similar to that of a Business Analyst – i.e. someone who has an understanding of BI from both a business and technology perspective. Miller et al. (2006) define the role of the Business Analyst in a BICC as someone who acts as the business representative, understands how data is used in the organization and has experience in applying BI and analytical techniques to business problems. This role could also be viewed as a BI champion – a skilled BI resource who is part of the business team rather than a BI team where a BICC has not been established.

The skills shortage mentioned by a number of the interviewees is borne out in the media. The demand for BI skills exceeds supply - Seldon (2008) reported that BI skills lacking include experienced resources, resources with “business sense and the ability to understand business processes and link it with the IT environment”. There is also a need for BI technology specialists such as ETL developers and report and dashboard developers.

Interviewees emphasized the need for greater involvement and initiative to come from the business, while the technology aspect of BI was seen as simply an enabler. This view is supported by the

finding that almost all the organizations are satisfied with the BI tools (regardless of whether BI is owned by business or IT) that are in place but not with the value that is being delivered.

The concept of different 'personas' being involved in the BI process could be a valuable tool to assist an organization in understanding its BI process and where there are opportunities for improvement in the ways and speed with which it delivers information. One of the dimensions of the information maturity model suggested by Davis et al. (2006) is people and one of the facets an information maturity assessment would aim to uncover would be who uses information throughout the organization, how they are using it and whether it is being used to its best potential.

Six of the interviewees had established a BICC or were in the process of doing so. This finding is consistent with a study done by The Data Warehousing Institute in which 66% of the 212 respondents rated "implement a BI competency centre" as a being "high" or "very high" as an approach for getting more business value out of their BI budget (Eckerson, 2010).

I4 suggested that the term BICC is in fact used to describe many different approaches to the way BI capability is structured. Although Miller et al. (2006, p2) propose specific structures, roles and processes that are part of a BICC, the general definition provided ("a cross functional team with a permanent, formal organizational structure with defined tasks, roles, responsibilities and processes for supporting and promoting the effective use of BI across the organization") could be interpreted and implemented in a number of different ways but still meet the goal of facilitating the effective use of BI throughout the organization. The structure and size of the organization are factors that affect how and where within the organization a BICC is implemented and owned. In an organization with a decentralized business structure but a centralized IT area, IT ownership of the BICC may be the only practical solution but strong relationships with the business teams and BI users would be essential in order to ensure that BI is driven by the business and its needs, not those of IT.

## **The Value of BI and its Measurement**

The scenario leading to management questioning the value of BI appears to bear a number of similarities to that of IT. BI value is also a complex issue and this study finds support for each of the reasons Le Roux (2001) suggests lead to questions about the value of IT (high and increased spending, a poor track record of delivery and variable expectations around the role of IT).

Whilst Le Roux (2001) suggests that the challenge facing IT evaluation is a definition of value rather than the method of evaluation, Gibson, et al. (2004) question the applicability of IT evaluation

methods for BI and the need for a different approach to be developed. None of the interviewees had a comprehensive way of measuring what BI's contribution was in terms of overall business value. Although many saw this as desirable, they also agreed that it would be difficult to define and one questioned the value that such an exercise would deliver. Kaplan and Norton's (1992) widely held view that "what you measure is what you get" was not supported by all interviewees when it came to BI, with "gut feel" and intuition also being acknowledged as playing a role in assessing BI value.

The Project Management Institute states that project objectives must be quantifiable, tangible and measurable (PMI,2000). However, the benefits associated with BI are often intangible, supporting the suggestion by Gibson et al. (2004) that traditional IT measurement approaches may not be appropriate for BI. Intangible benefits require a qualitative measure and a subjective approach (Ward & Daniel, 2006, p20). Amongst the suggestions for improved BI evaluation from the interviewees is the need for the inclusion of "soft" benefits and value, a view shared by Venter and Tustin (2006).

Intangible and indirect benefits remain a challenge in the measurement of BI value as despite the effectiveness of the BI process, value will not be realized from this effort and investment unless the information is used by the business. The use of perception based measures for BI value measurement is appropriate due to the qualitative and intangible nature of the benefits, many of which do not exist as objective measures (Elbashir et al., 2008).

Balanced scorecard-type measurement and formal benefits management processes are approaches that have been proposed to address challenges in the measurement of IT value that could offer organizations a way of measuring BI value. Lonnquist and Pirttimaki (2006) proposed the use of a balanced view of BI performance such as the Performance Prism approach. The use of a process model for this study has shown that the value delivered by BI is a result of actions that take place throughout the BI process – from the definition of the strategy to the use of the information through to improved organizational performance. A scorecard suggested by Lonnquist and Pirttimaki (2006) could be used to build a comprehensive view of the value derived from BI from the perspectives of stakeholder contribution and satisfaction, capabilities, processes and strategy.

The instrument proposed by Elbashir et al. (2008) uses 22 perception-based, weighted measures to assess the contribution of BI to organizational performance. By grouping the measures according to aspects of Porter's (1985) Value Chain, it is possible to identify areas where BI is not contributing as it should. BI's contribution to organizational benefits (such as increased revenues and improved

competitive advantage) is rated, as well as business process related factors such as improved inventory turnover and reduced marketing costs. This instrument could be used by organizations to assess whether the value that is expected to be realized as a result of investment in BI is being realized in qualitative rather than quantitative terms.

Benefits management approaches are based on concepts of identifying, planning for, realizing and reviewing the benefits related to a project. Although some of the organizations studied use business case documents, the primary purpose of identifying benefits at this stage is project justification and budget approval. The inclusion of a benefits management section could be beneficial in a BI environment as it would formalize the identification, ownership and assessment of the benefits related to specific BI initiatives. The use of Ward and Daniel's (2006) classification of benefits according to their degree of explicitness (financial, quantifiable, measurable or observable) could help guide BI owners in understanding what measures are appropriate for assessing the expected and actual benefits that a BI initiative delivers. A tool such as the benefits dependency network proposed by Ward and Daniel (2006) could be valuable in the BI context as it provides a structured way to tackle the challenges indirect and intangible benefits present. Benefits management also addresses the problems experienced with measuring delayed benefits as the timeframes within which the benefits are to be measured are determined as part of the planning process.

### **Improving the Value the BI Delivers**

Most of the interviewees were satisfied with the BI tools their organizations had implemented and believed that the tools in place were what were needed. Most were also satisfied with the level of vendor support that was provided, even though it was focused on product support and not the realization of value from the products purchased. Whilst some acknowledged that vendors had over-promised when selling products, the interviewees accepted that it was up to the BI team and the users of BI information to ensure that the organization realized value from the investment in BI.

There were a number of suggestions as to how what I1 referred to as the 'production cycle' of information could be improved. BI's contribution to improved organization performance is often dependent on the speed with which information can be produced and acted upon (I5). The roll-out of self-help tools to appropriately skilled business users is one way to speed up the delivery of information to the people who should act on it. 66% of respondents in the TDWI 2010 survey on BI practices rated "Implement self-service BI" as being "high" or "very high" as an approach for getting more business value out of their BI budget (Eckerson, 2010).

Daniel (2007) recommends using prototyping, proof of concept deliverables and other more 'agile' development approaches. Whilst I1 saw opportunities to reduce costs through the exploitation of synergies in relation to investment in BI, I2 highlighted benefits that could be realized if some of the outputs from BI were shared more widely within the organization.

The successful delivery of BI projects will increase the demand for BI use in an organization which in turn highlights the need for an efficient BI process. A considered approach to prioritization using a document similar to a business case (with a value measurement and monitoring component to it) would ensure that BI efforts are concentrated on those most likely to provide a return. There is also a need for clear and accurately stated business requirements to be provided.

## Chapter Summary

This study set out to examine how BI is adding value to organizations, how that value is being assessed and what approaches are being followed by these organizations to ensure that they maximize the return they get from their investment in BI technology.

Information maturity models enable organizations to examine the environment in which their BI initiatives will be undertaken and offer suggestions as to what steps should be taken in order to avoid some of the problems that typically cause BI initiatives to fail. Similarly, strategy and ownership of BI ensure there are clear plans in place to reach the agreed goals for BI.

In terms of BI measurement, the study supports Le Roux's (2001) suggestion that dissatisfaction with IT value occurs as a result of a lack of understanding of the definition of value rather than its measurement. The challenge appears to lie in developing a better understanding as to how BI contributes to results in the Ends process and tracing BI activity back through the Ways, Means and Ends processes to find appropriate metrics to use to monitor BI's overall contribution. There are a number of benefits measurement and management approaches that could be customized and tested to ascertain their suitability as a framework for a structured, formalized approach to defining and measuring BI business value.

It is encouraging to note the number of suggestions that the interviewees were able to provide to help optimize the business value they could realize from their BI assets as well as the acknowledgement that the organization, not the vendor of the BI products in use, is responsible for the realization of BI business value.

## Chapter 6 – Conclusion

Although BI spending continues to grow and organizations become more dependent on BI to help them reduce costs and increase revenue, the challenges associated with measuring the business value that can be attributed to the investment being made in BI remain unresolved. The benefits and business value associated with the implementation of BI initiatives are often intangible, indirect, delayed and of a non-financial nature (Lonnqvist & Pirttimaki, 2006) and the realization of business value is dependent on the appropriate use of the information that BI delivers, not simply on investment in BI technology .

It is widely accepted in project management approaches that it is unlikely that any benefit will be realized unless it can be effectively measured and monitored (Reiss, Anthony, Chapman, Leigh, Pyne & Rayner, 2006; Symons, 2006). Contrary to this belief, there are suggestions that BI does deliver value, even though that value may be implicit (Crossland, 2007; Gibson & Arnott, 2005). However, unless the benefits associated with BI are correctly identified, monitored and measured, BI initiatives will not receive appropriate levels of support as the possible returns will not be accurately stated (Gibson et al., 2004).

A review of the literature available on the subject of BI value revealed that there is a need for further research as to whether the traditional approaches used for the measurement of IT value are appropriate for BI (Gibson, et al., 2004) as well as qualitative research into the 'soft' issues that play a key role in the deployment of BI and how BI adds value to an organization (Venter and Tustin, 2006). The purpose of this research was to investigate how BI is adding value to organizations in South Africa and what processes and methods are being followed for the evaluation of the business value that BI delivers. It also sought to understand what approaches are being used to maximize the potential value that the organization's investment in BI could deliver.

A multiple-case study strategy was used and the data for the research was collected via semi-structured interviews with people fulfilling a BI management role at nine organizations. The process model proposed by Soh and Marcus (1995) and adapted by Ward and Daniel (2006) and Ramdani (2009) was used as a framework for the study. The data collected was coded using inductive and deductive codes and themes.

The information maturity level of an organization was revealed to have an impact on the outcome of BI initiatives. Organizations which have reached a certain maturity level are also more likely to have established a BI strategy and identified an owner for BI within the organization. In this study, organizations that did not have a clear BI strategy also lacked a clearly identified owner for BI. Clear



ownership of BI and a documented BI strategy are key to the measurement and realization of business value from BI.

Despite differing views as to what constitutes a BICC, most of the interviewees in this study either had a BICC or were in the process of building a centralized BI capacity that could address the BI needs of the organization. BI strategy and ownership, as well as the information maturity level of the organization play a role in the establishment of a BICC. A key role in any BI team, regardless of structure, is a type of Business Analyst – someone who has a good understanding of the business as well as the BI process.

In terms of the measurement of BI value, analysis of the data collected revealed that whilst there is acknowledgement that delivering BI value is the responsibility of the organization itself, rather than the responsibility of the vendor/s of the products being purchased - despite any promises made by the vendor during the sales process. Technology was also seen as an enabler in the BI value process. Certain of the interviewees included in this study were willing to accept that the business value attributable to BI investment either cannot be measured or is not worth measuring. This view contradicts widely accepted project management principles and methodologies as well as literature regarding value realization and measurement which states that “what you measure is what you get” (Kaplan & Norton, 1992).

Other interviewees stated that whilst BI value measurement was desirable, it was not currently being measured as they were unsure of how to measure it with a fair degree of accuracy. In the author’s view, this may be one of the reasons contributing to the view that BI value is implicit and for the “gut- feel” view that if it is being used, it is adding value.

There was support for a BI value measurement approach that would give consideration to soft factors, intangible, indirect and delayed benefits. A formal Benefits Management approach could offer BI stakeholders a structured approach to identifying, classifying, measuring and monitoring the benefits attributable to BI. A Benefits Management approach would also ensure that requirements were clearly stated and the expected benefits and measures were agreed on upfront. A “balanced” view of performance such as a Balanced Scorecard or Performance Prism is another structured approach that could be used to build a structured approach to BI value measurement.

It emerged that whilst the organizations involved in this study are, for the most part, satisfied with the BI tools and technology they have invested in, there is a need for quicker returns from that investment. Many suggestions were made as to how BI could provide value sooner, including

accurately stated requirements, prototyping-type development approaches, the use of self-help tools and the exploitation of synergies across the organization.

The organizations included in this study represent a number of different industries. Although the study was undertaken in the Western Cape, there is no reason to suggest that the results would not be generalisable to the rest of South Africa, or in fact, to the rest of the world as many of the organizations are multi-national organizations and the BI tools and technology in use are provided by global vendors.

A further research opportunity lies in the construction and validation of a balanced performance measurement tool for BI (such as a Balanced Scorecard or the Performance Prism suggested by Lonnquist and Pirttimaki (2006) or the effect of the implementation of a formal Benefits Management approach on BI projects in a commercial environment. This research could offer BI practitioners a valuable tool that would highlight the overall role BI plays in delivering value to an organization.

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## Appendix A – Invitation for Participation in Study



### Department of Information Systems

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Dear Mr/Ms

#### Realizing the Business Value from IT Asset Management

As an Information Systems Masters student at the University of Cape Town, I am conducting a number of interviews as part of a research project on how Business Intelligence (BI) adds business value to organizations and how this value is measured. The aim of the project is to help organizations assess the value of their investment in BI and to identify good practices to ensure that this value is delivered. The project hopes to build a generalizable view on the topic by collecting data from institutions and organizations in as many industries as possible. Professor Derek Smith of the University of Cape Town will be supervising the project.

The data will be collected via interviews with CIOs and senior BI managers (or individuals in similar roles) in organizations in Cape Town. The interview will take less than an hour and an outline of the questions is attached. The interview will be recorded and transcribed and sent to you for validation. A full report regarding the findings of the study will be made available, however, individual company data will not be divulged and data will be aggregated in the analysis to show trends and issues.

I would like to conduct interviews in Cape Town during October and November 2009 and believe that your input would be valuable to the study. It would be greatly appreciated if you would be part of this research by making time available to be interviewed.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'MCrossland'.

Maria Crossland

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"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."

## Appendix B – Semi-Structured Interview Protocol

### Participant and Organization Overview

1. Describe your role in the BI Process within your organization
2. What is your past experience in this role/organization?
3. Does your organization have BI strategy and how is it aligned with the organization's strategy?
4. Who 'owns' BI within the organization?
  - a. *IT or Business – what was the rationale behind the decision?*

### Means

1. What do you consider to constitute your organization's BI assets?
2. Does the organization place a value on this asset?
  - a. *Is it seen as an asset by senior managers/executives?*
  - b. *Is a value assigned to it? If so, how is the value determined?*
  - c. *What metrics are used?*
  - d. *Is business value measurement a formal process and does it act as input for future projects?*
  - e. *How are BI related investment decisions made?*
3. Have the BI products you are using delivered on the vendors' promises?
4. Does vendor support focus only on technical issues or also on supporting the implementation of the product to deliver business value?
5. How is the value of the asset optimized?
  - a. *What tools and approaches do you use?*
  - b. *How is data quality managed within the organization?*
  - c. *Are the BI tools available adequate to enable the delivery of the information required?*

### Ways

1. Who uses BI within the organization and for what?
2. Has a BI competency centre been established? How has it been effective?
3. To what degree do end users adopt 'self-help' approach to obtaining information? Is a 'self-help' approach encouraged?
4. Is the business value attributable to BI actively measured and managed?
  - a. *How, when and by whom is the predicted business value of a BI initiative estimated?*
  - b. *Over what time period are the benefits assessed?*
  - c. *How, when and by whom is the actual business value realized from a BI initiative measured?*
  - d. *How can measurement of the business value of BI be improved?*
5. The business value of BI initiatives is often intangible and indirectly attributable to improved process efficiencies, service quality and product offerings. How are these benefits quantified and tied back to BI activities?

### Ends

1. What role does BI play in generating or protecting your organization's revenues and/or competitiveness?
  - a. *How?*
  - b. *Why?*
2. How does BI boost your organization's performance?
  - a. *Can you provide some examples?*
3. Can you recount examples of successful and unsuccessful BI initiatives?
  - a. *How was your organization's competitiveness boosted or compromised?*
  - b. *What were the major contributors to the outcome?*
4. To what degree do competitor's activities drive new BI initiatives within the organization?
5. How do you think your organization could increase the value it derives from its investment in BI?
  - a. *What challenges are you likely to face in achieving this?*

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## **Appendix C – Permission Acknowledgement Statement**

Statement to be read to interviewees at the start of the interview:

This interview forms part of the research 'Means, ways and ends: How is business intelligence adding business value and can it be measured?'.

All data about individuals and organizations will be kept confidential. Participation will remain anonymous. This research is conducted for academic purposes only. If the broader community can benefit from the findings that emerge the results may be reported at a conference, in a journal, or conference proceeding. As discussed above, no mention will be made of the company or individuals that have participated. You may stop participating if the process becomes offensive.

Please confirm that you are taking part in this research voluntarily and consent to the recording of this interview.

University of Cape Town

## Appendix D – Coding Manual

Theme	Codes
Means/Value Initiation	Constitution of BI assets Value of BI assets Metrics and process for measurement of asset value Vendors Promises Vendor Support Data Quality (DQ) Meta & master data management Value Optimization other than DQ Adequate tools?
Ways/Value Conversion	What is BI used for? BICC Self-help options and flexibility Intangible/indirect/delayed benefits Reports not being used
Ends/Value Realization	Competitiveness/performance Successful BI Unsuccessful BI Competitor activity Increased value from BI Challenges realizing value from BI
Strategy	Link between strategy and value realization Alignment of BI/IT/Organization strategy
Ownership and Structure	BI ownership BI budget ownership Centralised/Decentralised Maturity Models Business involvement in BI BI as an enabler
Value	How BI adds value Value of not having BI Soft/qualitative value Role of the business case Executionable BI If its being used, its adding value
Resources	Skills Resources that understand business and BI Training
Measurement	Measurement of BI value Time period to assess value Not measurable Customer satisfaction surveys
Success Factors	Reactive vs proactive Time to deliver BI evangelism Perception

Table 2 – Codes used for coding interview transcripts